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REPORT ON THE MARKETING OF DAIRY PRODUCE PARTS 1 & 2

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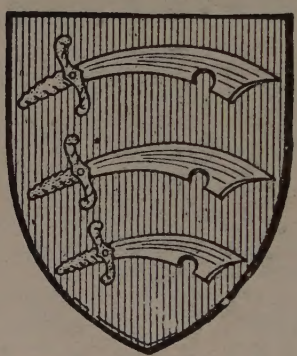

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PART I. CHEESE.

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MINISTRY OF AGRICULTURE AND FISHERIES.

Report

on the

Marketing of Dairy Produce

in

England and Wales.

Part I.—Cheese.

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Report

on the

Marketing of Dairy Produce

Economic Series No. 22.

Report on the
MARKETING OF DAIRY PRODUCE
in England and Wales.

PART I.—CHEESE.

CORRIGENDA.

Fig. 24 (facing p. 83). *For* Cheshire *read* Cheddar.

Fig. 36 (facing p. 93). *For* Whitechurch *read* Whitchurch.

Page 126, second para., line 13.
For TS" scale *read* "S" scale.

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THE MARKETING OF DAIRY PRODUCE IN ENGLAND AND WALES. PART I.—CHEESE.

INTRODUCTION.

Before the industrial development of the latter half of the nineteenth century, the manufacture of cheese and butter was the chief objective of the dairy industry of this country, the sale of milk not having acquired the importance that it has to-day. The towns obtained their milk supplies from herds kept on neighbouring farms or in the towns themselves, but, as population increased, local production soon became inadequate and, with extending rail facilities, supplies from ever-widening zones were perforce drawn upon to meet the requirements of the large consuming centres. This expansion of the " catchment areas " took place at the expense of butter and cheese making, which, in any event, have to face the competition of imported dairy produce and are more laborious than milk selling. As time went on, newcomers to milk production were mostly those attracted by the fluid milk market and situated with ready access to it.

The need to draw milk from long distances made the daily adjustment of supply to demand a matter of considerable difficulty, which compelled the distributive trade to establish depots or " country creameries " in the important dairy districts, not merely for the assembly of milk for distant sale, but for the local conversion of milk that proves to be surplus to day-to-day requirements. Cheese making, which utilises more of the constituents of the raw material than butter making and requires less expensive plant than that needed for the manufacture of dried or condensed milk, is the process generally adopted for the conversion of milk surpluses. It therefore assumes a dual role in the dairy industry ; where still carried out on farms, it is the chief purpose of milk production ; in the country creameries it is mainly a convenient way of dealing with milk, bought under contract, which cannot find an outlet in the fluid milk market.

Though there is a limit to the quantity of milk that can ultimately be consumed in liquid form, there is none to the amount which farmers can dispose of at a price ; but since milk which is converted into butter or cheese has a lower value than when sold for liquid consumption, the price must be low enough to safeguard buyers against loss in converting that portion of their milk supply which is surplus to consumer-demand. The eagerness of producers to sell their milk rather than to retain it for conversion on the farms must accordingly tend to force down the average level of producers' milk prices. Moreover, most farms, from the standpoint of transport

facilities, are now able to enter the fluid milk market, whether by sale to the towns directly or through country creameries. It is therefore of importance to all milk producers that farm cheese making should be maintained and, if possible, extended, in order that the already swollen stream of supplies to the fluid milk market may be spared unwelcome tributaries from farms that would not be concerned with the milk market at all if cheese making were a more attractive proposition. The complete solution of the problem of equating supply and demand in the fluid milk market, however, may involve the extension of factory cheese production in this country on specialist lines resulting in a higher level of quality than is generally attained by the creamery product.

From the standpoint of the farm cheese-maker, one important, if obvious, step that can be taken, is to ensure that skill in cheese manufacture is supported by efficiency in marketing. The following report, embodying the results of a detailed investigation into the marketing of cheese in England and Wales, has accordingly been prepared for information. Although cheese is a manufactured product, the quantity of cheese made on agricultural holdings in this country is still three times as much as that produced in factories. The farmer's interest in cheese marketing is, therefore, not merely that of the producer of raw material for a factory. In the first place, the farm cheese-maker has the quality of the final product entirely under his own control. Though the actual technique of manufacture is outside the scope of this report, it is one of the main objects of the report to emphasise the importance to the farmer of concentrating at every stage, from the production of the raw material to the marketing of the finished article, on the attainment of a high standard of quality. In the second place, the farmer, as a seller of cheese, is directly interested in the actual technique of marketing. Attention is therefore drawn in the report to certain defects and weaknesses in the present methods of marketing home-produced cheese, and suggestions by way of improvement are put forward for consideration. Where useful, comparisons are drawn between the practice at home and abroad.

PART I.—A PRELIMINARY SURVEY.

CHAPTER I.—TYPES AND VARIETIES.

The aim of cheese making is the conversion of some of the constituents of milk into a less perishable and bulky product which is, at the same time, a palatable foodstuff of high nutritive value and ready digestibility.

Cheese is a compact product, generally made from whole milk and possessing characteristic flavour which depends on the method of manufacture and the subsequent ripening processes ; cow's milk is almost universally used. Cheese, however, is in some countries made from skimmed or partly skimmed milk, while in others, spices and herbs are still used as flavouring agents. Not all cheese is made from cow's milk. In some southern European countries, goat's milk is used, while the Roquefort variety, in France, is made from sheep's milk. Nevertheless, the constituents of all cheese are practically the same ; it is their relative proportions only which vary, and these are determined chiefly by the method of manufacture employed.

The principal stages in the process of cheese manufacture are as follows :—

(i) The natural development of lactic acid in the milk. This may be aided by the addition of "starter"—a culture of lactic acid-producing bacteria—to the milk.

(ii) Coagulation of the milk by the addition, generally, of rennet. This coagulation is assisted by the preceding development of acidity in the milk.

(iii) Separation of the whey—the liquid product of coagulation—from the curd or solid product. The process of whey separation is a complex one involving :—

- (*a*) the cutting of the curd into pieces varying in size according to the type of cheese being made ;
- (*b*) heating or "cooking" the curd with the whey in the coagulating vat—an operation which is not, however, performed in the manufacture of certain varieties, e.g., the soft cheeses and Stilton cheese ;
- (*c*) draining off the whey ;
- (*d*) breaking up the matted curd into small pieces, which are placed in a mould of the required shape ; and
- (*e*) with some varieties, pressing the curd in the mould.

(iv) The ripening period—varying in length according to the kind of cheese—during which the cheese is stored under suitable conditions of temperature and humidity, for the purpose of developing the required flavour and texture and, in certain cases, mould growth.

The principal factors in the raw material and in the manufacturing process which determine the character of cheese are :—

(i) The butter-fat content of the milk. Cheese made from milk of low fat-content tends to be tougher and more leathery than that made from richer milk.

(ii) The bacterial flora of the milk.

(iii) The degree of acidity developed at the various stages of manufacture ; this is largely influenced by the temperature at which the process of manufacture is conducted.

(iv) The amount of moisture left in the curd, which, again, depends on such factors as the temperature of " cooking," the size of cutting and the amount of pressure applied.

(v) The length of the ripening period and the temperature and humidity of the cheese-store during ripening.

The possibility of variation in each of these factors is responsible for the development of the large number of varieties of cheese which are known throughout the world. More than 500 different varietal names have been recorded, though this may give an exaggerated idea of the number of distinct kinds of cheese that are manufactured ; some so-called varieties of cheese are identical in all but name and between others there are only minor differences.

(i) Types.

As has been indicated, the amount of moisture left in the curd is one of the principal factors determining the characteristics of the final product, and, as this again is largely influenced by the amount of pressure applied, varieties of cheese may be classified into three types—viz., hard-pressed, lightly pressed and soft cheese, respectively. This grouping has the merits of simplicity and usefulness even though the borderlines cannot be rigidly defined.

The **hard-pressed** type of cheese is by far the commonest and most important. It is exemplified, in this country, by the Cheshire and Cheddar varieties, and in exporting countries, such as Canada and New Zealand, by a product which is modelled on the English Cheddar. The amount of pressure applied in the manufacture of such cheeses may be up to about 25 cwts. for a Cheddar weighing 80 or 90 lb. This pressure, together with the " cooking " of the curd, reduces the moisture-content, thus producing the outstanding characteristic of firmness and closeness of texture ; cheese of this type normally contains between 30 and 35 per cent. of water and the maturing or ripening processes develop comparatively slowly.

Hard-pressed cheeses may be transported over long distances and subjected to considerable handling without serious risk of deterioration. They can be put up in larger sizes than soft cheeses without losing shape ; most hard cheeses weigh between 40 and 90 lb. The harder varieties, such as Cheddar and Cheshire, are of deep cylindrical shape, and the less hard, such as Lancashire and

Dunlop, are usually made in the form of "flats." To assist in maintaining shape, hard cheeses are generally bandaged after coming from the press.

At the other extreme are the **soft** cheeses, in the preparation of which the solids are separated in a less firm coagulum and the moisture is not expelled by "cooking." The essential physical difference between this and the previous type is, therefore, high moisture-content, which, for soft cheese, ranges between 40 and 75 per cent. Other differences follow from the greater moisture-content. Thus, the soft varieties ripen more quickly and deteriorate more rapidly; they are relatively highly perishable and must be handled and transported carefully, and, if necessary, stored with the aid of refrigeration, and consumed within a few weeks of production. They are often so soft that they can be spread with a knife, and they have to be moulded in small sizes in order to preserve their shape. Cheese of this type are commonly made in round or square flats weighing from a few ounces to slightly more than a pound. They are marketed either in the original mould or in boxes or cartons, singly or several to a box.

Soft cheeses may be subdivided into those which are ripened, such as Camembert, and those which are unripened, such as Cambridge and Colwick. Coulommier (Fig. 1), and cream cheese may be either ripened or unripened.

Between the hard and the soft cheeses is the third group of **lightly pressed** cheeses. Their manufacturing process is similar to that of hard cheeses, except that the temperature of "cooking" and the pressure applied are less.* In addition, most of the varieties in this group, such as Stilton, Wensleydale, Gorgonzola and Roquefort, are so manufactured that normally the ripe cheese is permeated by a mould-growth; they are then known as "blue-veined" cheese. A ripening period of, generally, from three to six months is necessary to allow this mould to develop and exert its maturing influence.

Cheeses of the lightly pressed type are moderately firm and although they have a fairly high moisture-content of between 35 and 45 per cent., their keeping properties are not necessarily reduced on that account. For maturing, they may, in fact, be kept for a period of a year or more before consumption. Caerphilly cheese, however, is an exception in this respect and is normally consumed within from two to four weeks of manufacture.

The preceding classification relates to cheeses made directly from milk. Recent developments in manufacturing technique have made it necessary to provide for a fourth commercial type, namely, re-made cheese. Cheese of this type is described as "processed," "pasteurised," "pasteurised-blended," or "fancy"

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* In the manufacture of Stilton—which, because of its consistency and blue-veining is usually placed in this class—the curd is not pressed.

cheese, and is represented by numerous proprietary brands. It is manufactured from ripened cheese by a process which is outlined later in this report (see page 87). Processed cheese is usually made up in relatively small weights and may be bought in pieces of from 1 to 5 lb., or in smaller portions of a few ounces separately wrapped in tinfoil and packed attractively in cartons. The home manufacture and the importation of this type of cheese have greatly increased of recent years.

(ii) Varieties.

The varieties of cheese of commercial significance are relatively few in number. On the British market, only about two dozen are of any real importance.

(*a*) *Origin of Names.*—In the past, the various important cheese-making areas in this and other countries developed their own characteristic processes, and the resulting varieties, in most instances, took their names from the locality of manufacture; Cheddar, Cheshire, Caerphilly, Wensleydale, Roquefort and Gorgonzola are typical examples. Gradually a knowledge of these processes extended further afield and, in some cases, was carried by colonists to other lands. In this way, some varieties have attained a world-significance; Cheddar cheese, for example, is commonly manufactured in a number of countries, including New Zealand, Canada and the United States.

(*b*) *Numerical Trend.*—With the increasing application of scientific research to cheese making, there has been a tendency for the number of varieties manufactured in this country to decrease. Cheese-makers have turned their attention more and more to those varieties for which there is a marked demand from the industrial population. Then, again, the development of the liquid milk market has, in some instances, led to the virtual abandonment of cheese making in districts which formerly concentrated on the manufacture of local varieties. The process of elimination has been gradual and is not yet complete. The commercial importance of the Derby (Fig. 2), and Gloucester varieties, for example, shows a downward trend, owing probably to the favourable position which the counties of Derby and Gloucester occupy for milk selling,* but these varieties are still obtainable. The Suffolk, Warwickshire and Norfolk varieties are among those that, for various reasons, have failed to survive.

This decrease in the number of varieties has not been without its advantages. The manufacture of a large number of varieties is an obstacle to the standardisation of quality on a national scale and is calculated to perpetuate individualistic and uneconomic marketing methods. Further, the less that technical education in cheese making has to be diffused over a number of varieties, the greater will be its effect.

---

* *See* Economic Series No. 16, page 11.

FIG. 1.—Coulommier cheese.

FIG. 2.—Derby cheese.

FIG. 3.—Cheddar cheese, showing close texture.

FIG. 4.—Cheshire cheese, showing open texture.

(c) *Relative Importance.*—Based on the classification outlined above, the following Table indicates, in approximate order of importance, the principal varieties of cheese of each type, both home-produced and imported, on the British market, and, in the case of imported cheese, the countries supplying quantities of commercial significance :—

Type.	Home-produced.	Imported.	
	Variety.	Variety.	Country of Origin.
Hard-pressed	Cheshire Cheddar (English) Cheddar (Scotch) Lancashire Dunlop Derby Leicester Gloucester	Cheddar Cheddar Cheshire Edam Gruyere (Einmenthal) Gouda Parmesan	New Zealand. Canada. Canada. Netherlands. Switzerland. Netherlands. Italy.
Lightly pressed	Caerphilly Stilton Wensleydale Dorset Blue	Gorgonzola Roquefort	Italy. France.
Soft	Cambridge Colwick Cream	Camembert Brie Pont l'Evêque Bondon	France.
Processed	Cheddar Cheshire Lancashire Wensleydale	Cheddar Gruyere	Canada. Netherlands. Switzerland. France.

Certain Continental varieties of cheese—e.g. Camembert, Pont l'Evêque and Bondon—are manufactured in small quantities in this country.

(d) *Characteristics.*—The characteristics of the most important varieties made directly from milk are as follows :—

Hard-Pressed.

Cheddar.—This variety is of special interest both because the English variety is the prototype of all Cheddar cheese irrespective of the country in which it is made, and because, on account of the widespread manufacture of the variety overseas, the home product meets with more direct and severe competition from imported supplies than is the case with other varieties. More than one system of manufacture is employed in the production of

Cheddar cheese, resulting in minor differences in the product according to the particular system by, or locality in, which it is manufactured.

The typical English Cheddar (Fig. 3) is cylindrical in form, weighing from 80 to 90 lb. and measuring about 14 inches in diameter and 16 inches in height. It contains no extraneous colouring matter. When transferred to the ripening room after manufacture, it is contained in two one-piece bandages—an inner calico bandage and an outer linen bandage laced longitudinally ; each end is covered with a muslin cap. The texture is solid, with no signs of openness ; the body is firm and smooth and not soft, crumbly or pasty ; the texture of the immature cheese is distinctly flaky and the body is rubbery and elastic to the touch. The ripening period for a well made Cheddar is from two months upwards, and no loss of quality should be evident even after a year.

The process of manufacture of the Scotch Cheddar differs only in some of the finer details and, apart from the fact that Scotch Cheddar is more usually artificially coloured, the two varieties are practically interchangeable.

While the typical Cheddar is a large cheese, it is not uncommon for the output of the majority of farms to include a proportion made up in smaller sizes, ranging from 10 to 14 lb. each and measuring 9 or 10 inches in height and 7 or 8 inches in diameter. In Scotland, these are known as " stiltons," from their similarity of shape to that variety, and in England as " loaf " or " truckle " Cheddars. They are of convenient weight and shape for purchase, as whole cheese, by large-scale consumers, and they form a suitable means of utilising the surplus curd on farms where the daily milk output is slightly more than is needed for the manufacture of one or more large Cheddars.

New Zealand and Canadian Cheddars are made both coloured and uncoloured, according to market requirements, and resemble home-produced factory-made cheese.

Cheshire.—While Cheshire (Fig. 4) is a somewhat softer cheese than Cheddar, both are very much alike in outward appearance and form, except that the Cheshire cheese is made either coloured or uncoloured, according to the requirements of the market served, and is slightly smaller ; it measures from 12 to 15 inches in diameter and is of sufficient depth to yield cheese weighing from 40 to 80 lb. each. The distinctive feature of Cheshire cheese is its texture (see Fig. 5), which is crumbly, with a more apparent " grain," especially when immature, than is the case with Cheddar.

Slight modifications in manufacture are introduced at different seasons of the year which result in the production of three different types, known respectively as early ripening, medium-ripening and late-ripening Cheshire. The differences are mainly induced by cutting or breaking the curd into finer or coarser particles and by varying the temperature of " cooking " and the degree of acidity

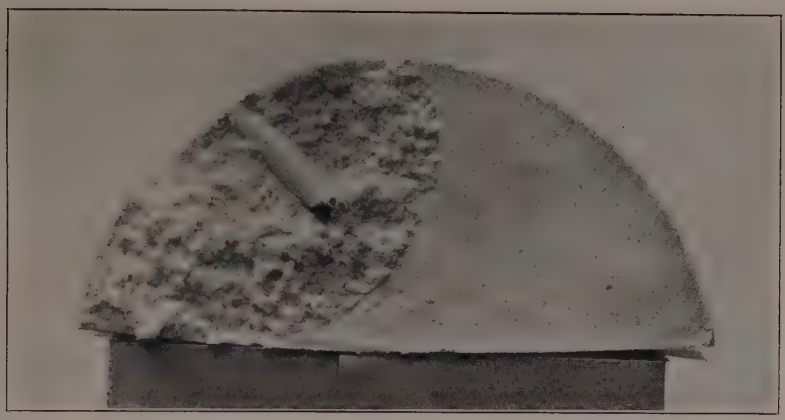

FIG. 5.—Cheshire cheese, cut and broken to show texture.

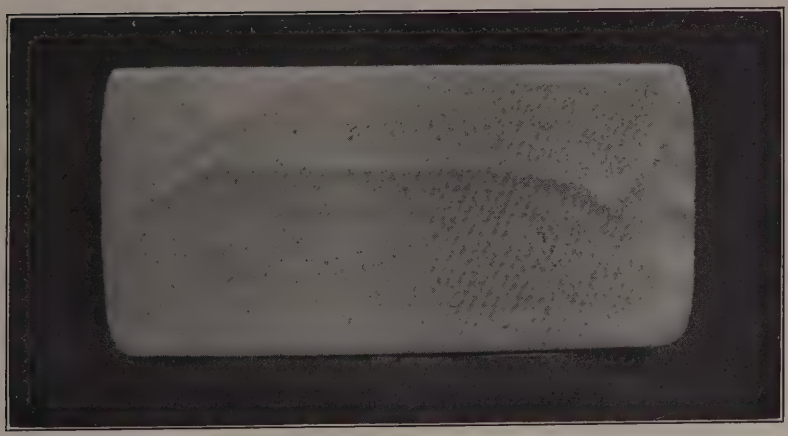

FIG. 6.—Lancashire cheese.

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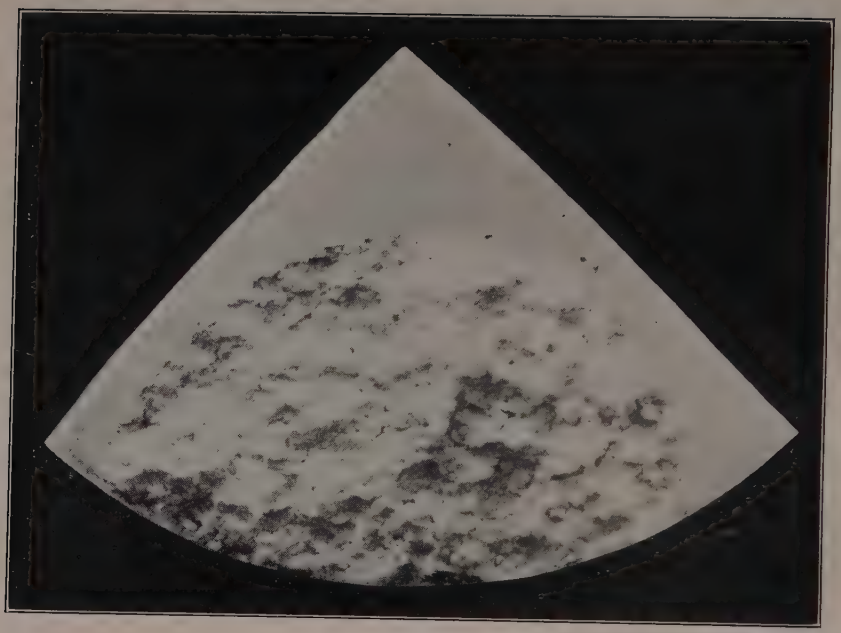

FIG. 7.—Lancashire cheese, cut and broken. (Compare Fig. 5.)

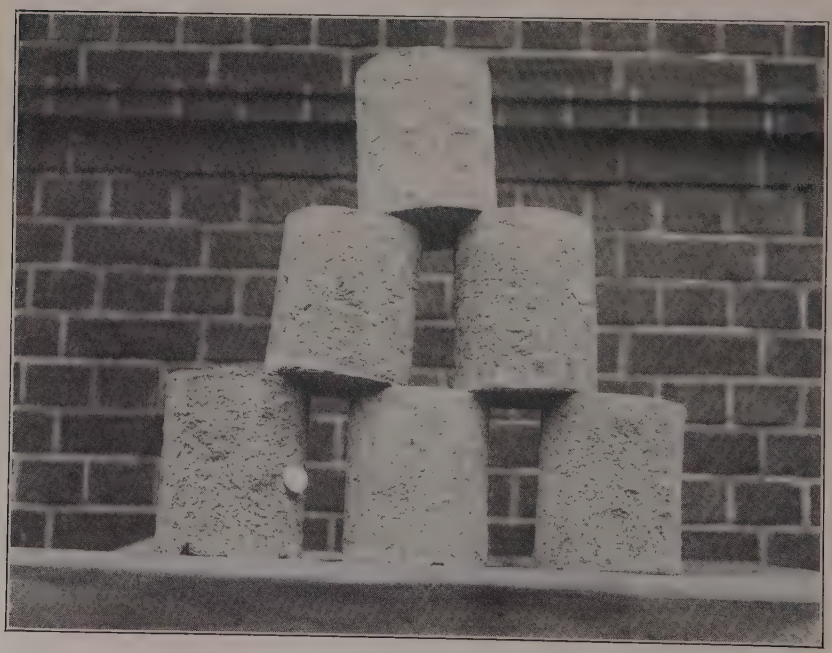

FIG. 8.—Stilton cheese.

developed before pressing. In the beginning of the season, when the supplies of home-produced cheese are short, the early ripening cheese is manufactured and put on the market for a few months to satisfy the demand for new cheese of the current season's make ; this is usually sold within from two to six weeks of its manufacture. As the season progresses, the supply of this type reaches saturation point and a more mature cheese is in demand ; after May and June, therefore, the medium and late-ripening varieties are made. The latter provides for a supply well into the beginning of the following year and may be kept for as long as twelve months ; the medium-ripening variety is ready for sale within from two to three months.

Lancashire.—The demand for Lancashire cheese is more localised than for the two preceding varieties and the variety is not so well known outside its area of production. It is mainly consumed in the industrial centres of south Lancashire. The Lancashire (Fig. 6) is an uncoloured cheese of the " flat " type, measuring about 14 inches in diameter and 9 inches in depth, and weighing about 50 lb. The texture (Fig. 7) is similar to but coarser than that of the Cheshire variety and the flavour is mild. It is a relatively short-keeping cheese and is ripened within from one to two months. A distinctive feature of its method of manufacture is that it is made from curds of different ages. The usual practice is to use curd obtained on two successive days, but sometimes a proportion of the curds made on three successive days is employed ; this mixing of curds of different degrees of acidity partly accounts for its looseness of texture. Among the English varieties, Lancashire cheese stands pre-eminent for its toasting properties, the ripe cheese melting down very easily into a smooth, custard-like substance having a rich and appetising appearance.

Dunlop.—The Dunlop is made exclusively in Scotland and derives its name from the village of Dunlop in Ayrshire, the county in which it is principally made. It resembles the Lancashire, in so far as it is uncoloured, of similar size, mild in flavour and an excellent toaster ; its texture, however, is not so loose or open as that of the Lancashire and it is made from one day's curd.

Edam.—Edam is the better-known of the two Dutch varieties of hard-pressed cheese imported into this country. In external appearance it is characterised by its spherical shape and by its red polished coat, which is obtained by dyeing and paraffining. The cheese are small, weighing only from 4 to 5 lb. Edam cheese are manufactured both on farms and in factories. The factory-made Edam is generally manufactured from partly skimmed milk in three grades, of which the minimum fat-content in the moisture-free substance is 20 per cent., 30 per cent. and 40 per cent., respectively. Full-cream Edam cheese is a farm-made product, and is seldom imported into this country. The cheese made from partly skimmed milk are consumed in a fairly fresh condition.

Gruyere.—The Gruyere is a product of Switzerland—where it is also known as Emmenthal. It is a hard-pressed variety, flat in shape, measuring about 6 inches in depth and up to 4 feet in diameter, and made up in weights of from 60 to 220 lb. The normal ripening period is from 6 to 10 months ; bacterial action during ripening produces characteristic holes in the substance of the cheese. In a perfect cheese, these holes should be about one inch in diameter and from one to three inches apart.

Lightly Pressed.

Caerphilly.—Caerphilly cheese (Figs. 45 and 46) is sometimes regarded as a hard-pressed variety but, in fact, the amount of pressure applied in its manufacture is comparatively slight. The demand for this variety is almost confined to South Wales, where it is a favourite of the industrial population. Caerphilly is the smallest of the home-produced varieties with the exception of the soft and proprietary cheeses. It is flat in shape, measuring about 12 inches in diameter and 3 inches in depth, and weighing 7 or 8 lb. only. It is uncoloured, with a springy, elastic, yet fairly soft texture, and has a mild flavour. It contains a high proportion of moisture and is consumed in a fresh condition—within from two to four weeks of manufacture. As a product, it has a number of advantages which appeal to the producer, viz., (*a*) the low degree of acidity developed in its manufacture enables it to be made throughout the year, (*b*) the yield is high, being about 1¼ lb. per gallon of milk, compared with an average of about 1 lb. per gallon for most varieties of cheese other than soft cheese, (*c*) it is marketed early, thus giving a quick turnover and involving less risk of depreciation during storage, (*d*) its manufacture is much simpler and takes less time than that of most other varieties, and (*e*) it can be made by producers whose daily output of milk is small.

Stilton.—The Stilton variety (Fig. 8) is the most popular of the home-produced blue-veined cheeses. In some respects, such as the omission of " cooking " and pressing the curd, its manufacture resembles that of soft cheese, but the long ripening period and the development of the characteristic mould-growth result in wide differences between finished Stilton and the typical soft cheese. Indeed, in consistency, the ripe Stilton closely resembles the hard cheeses, since it loses roughly 50 per cent. of its weight during ripening. The typical Stilton is from 10 to 12 inches in height and about 8 inches in diameter, the weight when ripe being about 14 lb. Externally, the cheese shows a brownish and uniformly crinkled coat ; internally, it exhibits a prominent mould-growth in veins distinct from the substance of the cheese itself (Fig. 9). The mould, however, should not be so pronounced as to give an objectionable or mouldy flavour, even after the full ripening period, which is normally from four to six months. A considerable proportion of Stilton cheese, as of Wensleydale, is marketed in the

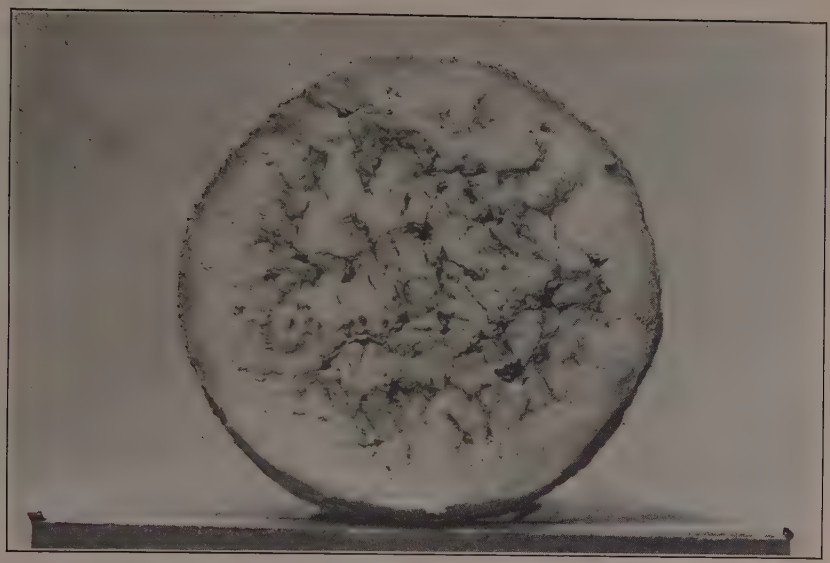

FIG. 9.—Cut surface of Stilton cheese showing blue veins.

FIG. 10.—Wensleydale cheese.

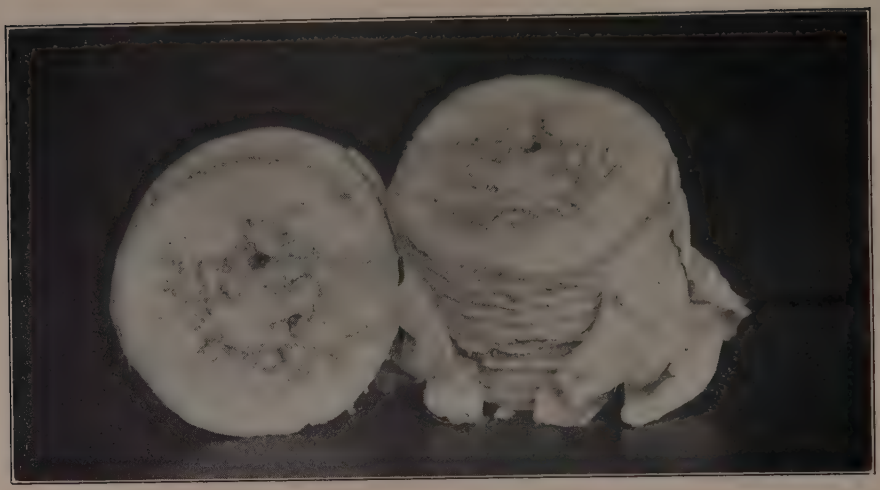

FIG. 11.—Cut surface of Wensleydale cheese showing blue veins and bandage.

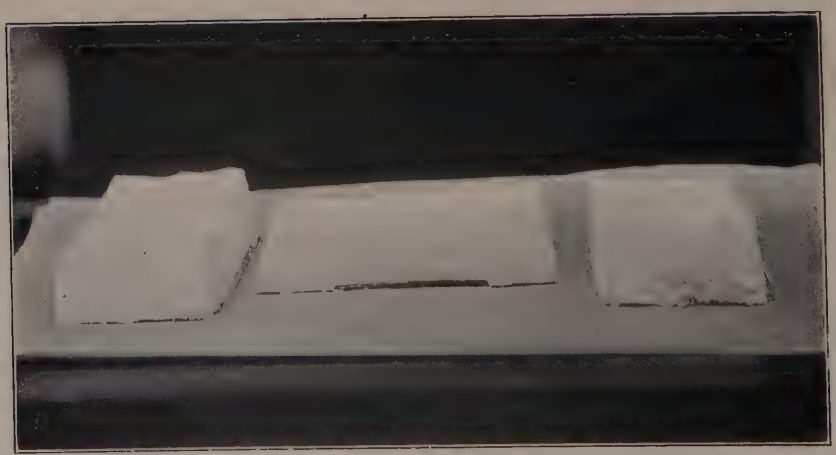

FIG. 12.—Cambridge or York cheese.

immature state, before the blue veins have had time to develop; this type of Stilton is known as "White Stilton."

Wensleydale.—The Wensleydale variety (Fig. 10) is marketed in two distinct forms, both manufactured by the same methods. The more typical Wensleydale resembles the Stilton in many respects but it is lightly pressed—with a pressure of about 3 cwt.—and is contained in a bandage during ripening; it is of the same size and shape as Stilton, is blue-veined and takes the same time to ripen, but it tends to be slightly more solid in texture (Fig. 11). The other form of the Wensleydale is flat and, although of variable size, is generally smaller. It is consumed in fairly fresh condition at about 6 to 8 weeks old, before the blue mould has had time to appear. The demand for this type of Wensleydale cheese is, in the north of England, similar to that for Caerphilly in South Wales.

Gorgonzola.—Gorgonzola, an Italian variety, is the blue-veined cheese most widely consumed in this country. In its country of origin, the seat of manufacture is the plain of Lombardy. The ripening of Gorgonzola is carried out by specialist ripeners. The curd, as soon as it has taken shape in the mould, is sold to the ripeners, who either take it into the hills to ripen or ripen it in artificially cooled stores. Before ripening, the cheese are dry salted and then perforated to admit air, which encourages the development of the characteristic blue mould. The cheese are ready for shipment after about three months' storage.

Roquefort.—In the south-west of France, where the variety originated, the characteristic feature of Roquefort cheese is that it is made from sheep's milk. The variety has been imitated in other parts of France and in Denmark, with cow's milk as the raw material. The Roquefort is flat and cylindrical in shape, about 8 inches in diameter by 4 inches in depth, and weighs about 4 lb. In its district of origin, the cheese is ripened in natural caves, the blue mould-growth being obtained by mixing with the curd bread crumbs on which the typical mould has been allowed to develop. Roquefort cheese develops practically no rind and is wrapped in tinfoil before sale.

Soft.

Cambridge or York.—The Cambridge or York (Fig. 12), made chiefly in the Isle of Ely and surrounding districts, is the principal variety of British soft milk cheese. It is sold fresh within a few days of manufacture as, if kept, it tends to develop an undesirable mould. It is oblong or square in shape, measuring 7 inches by 5 inches, or 6 inches by 6 inches, and about 2 inches in depth. It is marketed in rectangular wooden boxes containing several layers of cheese, each cheese weighing just over 1 lb. This variety is chiefly in demand during warm weather and is, therefore, made during the summer months only.

Colwick.—Colwick cheese is made in the district around the village of Colwick, near Nottingham—from which it derives its name—as well as in the adjoining area of north Leicestershire. It is similar in many respects to the Cambridge variety, but is round and weighs about 1½ lb. It is very largely manufactured by retail dairymen during the summer season. Its sale is almost entirely local.

Cream Cheese.—The manufacture of Cream cheese in this country is not confined to any particular locality, but on the whole is more extensive in the South than in the North. It is mainly produced in summer by farmers and dairymen with a market for this class of cheese in neighbouring holiday resorts. In general, two varieties of Cream cheese are manufactured—one, known as Double-Cream, made from cream containing about 50 per cent. of fat, and the other, known as Single-Cream, made from cream containing from 25 to 30 per cent. of fat. Both are similarly made, except that rennet is generally used in the manufacture of the Single-Cream type. Cream cheeses are moulded in various shapes and weigh from ¼ to ½ lb. each. For immediate consumption—within two or three days—the cheeses are unripened, but for keeping for a week or ten days they are ripened by the addition of a small quantity of "starter" to the fresh cream.

Camembert.—Camembert, a French variety, is the best known of the ripened soft cheeses on the British market. Its ripening process, which occupies from three to five weeks, transforms the raw curd into a soft buttery material with a reddish-brown surface. Summer-made cheese does not ripen typically and for this reason the manufacture of the best cheese is confined to spring and autumn. Like other soft cheeses, the Camembert is a small cheese, measuring about 4½ inches in diameter and 1½ inches in depth and weighing about ¾ lb.

CHAPTER II.—THE CHEESE-MAKING AREAS.

Cheese making is widely practised in Great Britain, but the industry is chiefly located on the western side where climatic and soil conditions are specially favourable to milk production. In England and Wales, it is concentrated in two main and three less important areas, of which the two former, taken together, probably account for 90 per cent. of the total output.

The five areas are as follows :—

(i) North-Western, comprising Lancashire, Cheshire, Flintshire, Denbighshire and parts of Staffordshire and Shropshire.

(ii) South-Western, comprising Somersetshire, Wiltshire, Dorsetshire and Gloucestershire.

(iii) Midland, comprising Derbyshire and Leicestershire.
(iv) Yorkshire Dales.
(v) South Wales, comprising parts of Pembrokeshire, Carmarthenshire, Glamorganshire, Monmouthshire, Breconshire and Cardiganshire.

Cheese is thus manufactured in all areas where milk production is an important part of the farming system with the exception of areas—such as Surrey, Sussex and Middlesex—where the milk-producing industry is a comparatively recent development stimulated by the proximity of important consuming centres, or areas, —such as Devonshire, Cornwall, North Wales, Cumberland and Westmorland—where butter making dovetails into a system of farming based on the raising of store cattle. Even in some of the cheese-making areas, more milk may be sold for distribution than is retained on the farms for conversion.

(i) North-Western.

This area is characterised by the manufacture of Cheshire and Lancashire cheese, each variety being made chiefly in the counties from which the two cheeses take their names.

The Cheshire cheese-making district is centred on the plain south of the Mersey, its boundaries being determined by both industrial and agricultural conditions. Its northern boundary runs from Chester to Crewe, north of which is a belt of country devoted to the production of liquid milk for the south Lancashire towns. Similarly, on the east side, the draw of the milk market of the Potteries prevents the cheese-making district from extending beyond a line from Crewe to Eccleshall in Staffordshire. On the south, agricultural rather than industrial conditions fix the boundaries. The south-eastern corner of Shropshire, in the Severn Valley, is primarily under arable cultivation and milk production does little more than meet local requirements. Continuing south of Shrewsbury along the southern boundary of the area, the hills, devoted to sheep farming, do not lend themselves to intensive milk production. On the west, cheese making gives place to butter making as the Welsh hills are reached. In the north-west corner of the area, the plain of Flintshire supplies milk to the Merseyside towns, notably Liverpool and Birkenhead. Within these boundaries lies the most important cheese-making district in the country, centreing on Cheshire, the most intensive milk-producing county in England and Wales.

In intensity of milk production, Lancashire is second among English and Welsh counties. On account of the demand for liquid milk from the numerous towns of south Lancashire, cheese making is confined to the north of the county and extends little south of the River Ribble. North of the river, the boundaries of the Lancashire cheese-making district follow fairly closely the county

boundary, production being especially concentrated in the Fylde district.

(ii) South-Western.

Though the south-western cheese-making district is more extensive than the north-western, milk production is less intensive and the total cheese output is lower. Broadly, the district comprises the counties of Somerset, Wiltshire, Dorset and Gloucester.

The main south-western cheese-making district lies in the counties of Somerset, Dorset and Wiltshire. Eastwards, cheese making gradually gives place to milk selling under the influence of the London milk market, so much so that cheese making in Wiltshire is now almost confined to the western side of the county. Similarly, more cheese is made in west than in east Dorset. Throughout the whole area, the influence of the London milk market is strongest in the vicinity of milk collecting depots or in localities well served by the railways. The three types of cheese most frequently made in this area are Cheddar, Caerphilly and, to a much less extent. Dorset Blue ("Blue Vinny"), a skimmed-milk variety of local significance only, made on butter-making farms.

The county of Gloucester may also be regarded as forming a part of the south-western cheese-making area. The local variety—Gloucester—is most frequently made, but some Cheddar is also manufactured. The county, once famous for its cheese making, is still an important dairying county, but its situation between the milk markets of Birmingham and Bristol and its good train service to London have led to the diversion of the raw material from the cheese industry to the milk trade; cheese manufacture is now carried on only on scattered farms.

(iii) Midland.

The Midland area is of less importance, from the standpoint of cheese output, than the two areas already described. Excluding soft cheese, the area produces three distinct varieties—viz., Derby, Leicester and Stilton, the manufacture of which is localised in Derbyshire, south-west Leicestershire and north-east Leicestershire, respectively.

Derbyshire has felt the pull of the liquid milk market even more than the south-western district. Excluding the mountainous region of the north-west, supplies of milk are exceedingly plentiful throughout, but the milk traffic, particularly to Manchester and to London, has become so extensive that cheese making has very greatly declined and farm cheese making has almost disappeared. Though Leicestershire is essentially a grazing and feeding county, considerable quantities of milk are produced in the south-west for the London market, but cheese making has declined and is carried

on only on scattered farms. In north-east Leicestershire, within a radius of ten miles from Melton Mowbray, there is, however, an area of specialised cheese manufacture, although, on account of the importance of stock feeding in the district, milk production is not highly intensive; milk is sent to Nottingham and to London, but the demand for liquid milk has not caused a decline in cheese making comparable with that which has occurred in other parts of the county.

(iv) Yorkshire Dales.

Dairy farming in Yorkshire is mainly concerned with the supply of milk to the West Riding towns. This market takes nearly all the milk from the southern dales, cheese making and butter making being practised on farms higher up in the less accessible dale-heads and in more remote parts. Wensleydale has the greatest milk production, and cheese manufacture is somewhat concentrated in this district. Elsewhere, cheese-makers are scattered; though the cheese-making area is large, extending across into the Cleveland hills and over the Pennines to Kirkby Stephen and Appleby in Westmorland, the supply of milk is not abundant except in the dales. The output of cheese is small on the high ground, where it is a by-product of stock rearing.

Four varieties of cheese very similar in type are made in this area—viz., Wensleydale, Swaledale, Cotherstone and Cleveland. Of these, Wensleydale is the most widely known and is the only one of commercial significance; none of the others has more than a purely local sale. Wensleydale cheese, for sale outside the locality, are now mainly factory-made. The keeping of cheese for the development of blue mould is little practised on farms in this area.

(v) South Wales.

Cheese making in this area is a factory, not a farm, industry. The area includes districts of intensive milk production, but much of the milk is bought by the liquid milk trade for the South Wales industrial centres and London, while, on the more remote farms, butter making is carried on in conjunction with store cattle raising. A comparatively small proportion of the milk is thus used for the manufacture of cheese. Cheese making is not concentrated in any particular locality, though more factories are located in Carmarthenshire than elsewhere. Caerphilly cheese was once the local variety but the amount now made in its native district is almost negligible. The varieties made in this area are Cheddar and, to a less extent, Cheshire.

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CHAPTER III.—FARM AND FACTORY CHEESE MAKING.

(i) Farm.

The types of farm on which cheese is made vary widely throughout the country, from large holdings with excellent homesteads and well equipped dairies where cheese making is the principal source of income, to small farms where cheese is little more than a by-product of stock raising.

In the Cheshire-cheese area, the main object of the farming system is the production of cheese. In Cheshire itself, the homesteads are generally well adapted for dairying. The standard of dairy buildings in Shropshire, the northern part of which is now pre-eminently a cheese-making area, is not quite so high as that in Cheshire ; in Shropshire, dairying has been introduced comparatively recently into the farming system as a substitute for cattle feeding. The holdings are large enough both in Cheshire and in Shropshire to justify hired assistance in the dairy. A member of the farmer's family is generally responsible for the technique of manufacture, while the unskilled work is done by hired help; this custom has largely counteracted the draw of the liquid milk market on the milk supplies of this area.

In the Lancashire area, also, cheese making is the main activity. In Yorkshire, on the other hand, on the farms at the daleheads and on the moors, cheese is made only in small quantities, which are carried in a basket to the weekly fair or exchanged for goods at the local grocer's shop ; as in the case of eggs and butter, the returns from cheese are often regarded merely as a perquisite of the farmer's wife.

In the south-western area, particularly in Somersetshire, the employment of paid cheese-makers is more common than in other producing areas. The practice of hiring cheese-makers and dairymaids for the season is a regular feature of the larger cheese-making farms. In the Midlands, there is less farm cheese making than in the west ; to a greater extent than in the areas previously mentioned, the factory has replaced the farm as the manufacturing unit. In South Wales, cheese making is now entirely a factory industry.

Throughout the country, instances may be found of farmers who manufacture cheese from milk purchased from their neighbours as well as from that produced by their own herds. Where this system is practised, the number of suppliers usually ranges from one to six. The system not only makes for cheaper manufacture, but, as the cheese-makers on the farms which undertake the manufacturing are generally highly skilled and the equipment and accommodation for cheese making are good, a product of better quality is turned out. It is also one way of meeting the difficulty of a shortage of skilled dairy labour. The milk may be paid for per gallon either at a contract rate or, on the assumption that one

gallon of milk is equivalent to one pound of cheese, at the price per lb. obtained for the cheese. In the latter case, the milk suppliers benefit directly by the higher price realised for the better quality cheese which is generally produced under this system. The whey is retained by the cheese-making farmer. There would appear to be scope for some extension of the system as a means of assisting in the solution of the surplus milk problem.

The farm manufacture of the different varieties is more localised than the factory manufacture. Tradition tends to hinder the introduction of other methods of cheese making into areas which specialise in the production of a local variety. Farm cheese-makers, whose technique has generally been learned from their parents, are, indeed, frequently incapable of making more than one variety of cheese. Moreover, well-established machinery generally exists for marketing the local variety, and this is especially important to the small producer. This localisation of varieties in the farm cheese-making industry has been encouraged in the past by the general belief that the character of a variety, particularly its flavour, was largely dependent on the local soil and herbage. Increased knowledge of the causes of varietal characteristics has done much to weaken this belief. The technique of milk production and cheese making is now regarded as the main factor in the development of the distinctive character of varieties. The old theory still survives, however, especially in the case of Stilton cheese, which is principally made in the Melton Mowbray district, where it is manufactured on a few farms but mainly in factories known locally as " dairies."

The case of Caerphilly cheese is exceptional as regards locality of manufacture. At one time made exclusively in South Wales, this variety is now chiefly manufactured on farms in Somersetshire. The demand of the South Wales industrial area for milk reduced the quantity of cheese made in that area, and cheese-makers in north Somersetshire found that by copying the method of manufacture practised in South Wales they could produce a cheese which had a near and profitable market.

The Cheddar system of cheese making has been most widely copied, both on farms and in factories, outside its district of origin. The manufacture of this variety can be more easily reduced to a routine than that of any other, and though this characteristic is of greater advantage in the factory than on the farm, it is sufficient, even in the latter case, to attract the newcomer, more particularly in a district in which no local variety is customarily produced.

In recent years, the farm cheese-making industry has declined in certain areas. The principal causes have been the increased demand for liquid milk and the competition of imported cheese. This has operated particularly in the neighbourhood of towns and

near industrial areas. The greater frequency of cash returns which generally results from the sale of milk is also an attraction to the farmer, though the early ripening varieties of cheese which are marketed at frequent intervals bring almost as rapid a turnover. Then, again, the forward sale of milk on contract eliminates uncertainty as to ultimate returns. A further element of uncertainty in cheese making is, of course, the risk of deterioration during ripening. In some cheese-making areas, also, notably in the Stilton district, the difficulty of obtaining suitable labour is partly responsible for the decline in the farm industry. Generally, the heavy labour involved in the process has tended to discourage farm manufacture and certainly to delay its resumption on individual farms, even when it was clearly more remunerative than milk selling.

(ii) Factory.

(*a*) *Development.*—Up to 1870, the cheese-making industry had been carried on solely in farm dairies. In America, however, eighteen years previously, an attempt had been made to economise labour by adopting the factory system. From this beginning, the establishment of cheese factories in America proceeded with great rapidity. Not only was labour economised but greater uniformity of quality was attained, enabling an export trade to this country to be developed, which soon adversely affected the English farm cheese-making industry. The first cheese-makers to suffer from the competition of American supplies were those producing the lower grades and the less popular varieties. Successful competition was, in fact, made easy for the importers by the large proportion of inferior cheese made in this country; in consequence, prices of home-produced cheese fell rapidly. The dangers of the situation for the home producer led the Council of the Royal Agricultural Society, in 1868, to institute an enquiry into the possibility of adopting the American factory system in England. In 1870, the report of the enquiry was published in the Journal of the Society; it recommended the adoption of the American system. Already, steps had been taken to start a cheese factory in Derby; this was opened in 1870 under the management of an American cheese-maker and with substantial financial support from local landlords. The Derby project was quickly followed by the building of a cheese factory at Longford, ten miles from Derby; within a few years, factories increased rapidly in number, particularly in Derbyshire. Cheshire was the next county to enter the field, with a factory at Tarporley. All the factories were on a co-operative basis and were owned by producers.*

The cheese factories at first realised satisfactory prices for their output. Their early financial success, and the eagerness of

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* *See also* Economic Series No. 1, pages 14 and 15.

farmers' wives to be relieved of the duties of cheese making, accounted for the rapid development of the factory system. Unfortunately for the movement, its inauguration coincided with the development of a simpler and more remunerative means of milk disposal—the sale of fluid milk to distant consuming centres. Under the stimulus of improved methods of transport, milk supplies were particularly attracted from Derbyshire. In 1874, the Windley Hall factory in Derbyshire sent to London a considerable quantity of the milk received; this was the beginning of a general movement by the factories in the same direction. Those with good rail facilities quickly changed their main function from cheese making to milk selling.

This change on the part of many of the early cheese factories coincided also with the establishment, by the ever-expanding milk distributive trade, of collecting depots or creameries in the districts of intensive milk production. In operating these depots, some process of milk conversion was found to be vital to the balancing of varying supplies with a varying demand, and cheese making was selected accordingly; the product was in popular demand, was not perishable, and a large proportion of the milk constituents were used in its manufacture. What cheese making lost in some areas by the decline of the single-purpose factories, it more than gained by the factory operations of the dual-purpose creameries. The distinction between the two types of factory remains but is not always rigid in practice; many that are maintained primarily for cheese manufacture also operate, at times, in the fluid milk market.

If the volume of milk available for sale off farms should continue to increase beyond the requirements of the milk trade, it is probable that the future may see again a development, through individual enterprise or through organised action within the dairy industry, of single-purpose cheese factories. The consequent specialisation in cheese making should make for higher and more uniform quality in the factory product. The bulk of the cheese imported into this country, which is characterised by a high level of uniformity, is factory-made.

The new process by which ripened cheese is re-made for the purpose of obtaining a product of standardised quality and increased keeping qualities is essentially a factory process. A number of existing cheese factories have taken it up, using their own or, at least, local material, but, in so far as both imported and home-produced cheeses are used, factories which exploit the process need not, for economy and convenience in securing raw material, be situated in dairying districts.

(*b*) *Ownership.*—A considerable proportion of the factory cheese produced in this country is made in the milk collecting depots or creameries which have now become a feature wherever milk supplies are abundant at a distance from urban markets.

These are mostly controlled by the milk distributive trade, but a number are owned by producers' co-operative societies.

The majority of factories which are maintained primarily for cheese manufacture are controlled by farming interests, co-operative or otherwise ; in some instances, cheese factors have an interest in factories of this type. Most of the farmers' co-operative cheese factories, as distinct from creameries, are situated in the Stilton district, where, within an area of about 15 miles diameter, there are eight. The first of these was established at Scalford, near Melton Mowbray, in 1903. While the primary function of most of these factories is cheese making, a few contract to sell a proportion of their milk in the summer. In the winter, cheese making may be continued or the factory may turn over entirely to milk selling, or may even close down, leaving the suppliers to make their own arrangements for the disposal of their winter milk. The last course s also followed, after the season's cheese making, by the two cheese factories still in existence in the Peak of Derbyshire. These two factories are the last of the original type which have preserved both their existence and their function.

A recent development in the factory manufacture of cheese is the establishment in certain districts of producer-owned, surplus-milk cheese factories. These are co-operative in principle and not necessarily run as profit-making businesses. They differ from producer-owned creameries in that they have generally no liquid milk trade and are regarded solely as outlets (or even as merely potential outlets) for the surplus milk of their milk-selling members. For this reason, they are generally small, their capacity varying from a few hundred up to a thousand gallons of milk per day. They are chiefly of interest as an attempt to enable producers to contract individually with the distributive trade for regular supplies of milk while retaining an outlet under their own collective control for their surpluses. The only attempt to carry out this plan on a county-wide basis is in East Sussex. The lead of this county has been followed, to some extent, by West Sussex, Wiltshire and Hampshire.

(*c*) *Varieties Manufactured.*—The Cheddar process is the most suited to the routine of factory operations. All English varieties are, however, factory-made to some extent. Owing to the spread of technical education in cheese making and to the similarity of the equipment used in the production of all the hard-pressed cheeses, there is little difficulty—given skilled and competent supervision—in manufacturing most varieties on a factory scale. The equipment necessary for making the blue-veined cheeses, is, however, unsuitable for the making of hard-pressed cheeses ; those factories which make cheeses of the former type usually, therefore, specialise on them.

Factories which produce hard-pressed cheese generally concentrate on the manufacture of one variety, the particular kind

manufactured being determined by market requirements and, to some extent, the locality in which the factory is situated. Two factories in Derbyshire and one in Lancashire, for instance, make the local varieties exclusively. Similar varietal localisation is found in the Cheshire and Cheddar cheese-making areas, though the Cheddar variety is made to some extent in factories in the north-west. No factory specialises exclusively in the production of Leicester or Gloucester cheese. In South Wales, factories make both Cheddar and Cheshire cheese. In the farmer-owned surplus-milk depots, Cheddar is the variety usually made.

In making " pasteurised " or " processed " cheeses, Cheshire, Cheddar, Lancashire and Wensleydale cheese have so far mainly been used, each variety, if skilfully made, retaining its own characteristic flavour with some modification. The blue-veined varieties when ripened do not lend themselves to this process since, though the flavour may remain, the characteristic blue veins disappear.

(*d*) *Milk Supplies.*—The greatest difficulty with which the factory system of cheese making is attended is that of obtaining satisfactory supplies of raw material. The most important requirements are that the milk should arrive at the factory fresh and clean and at the proper time. Militating against the attainment of these requirements are the distance which the milk has to be transported from the farm to the factory and the frequent indifference of the milk producer to the condition of his milk. The wider the radius from which supplies are obtained, the more likely is the milk to deteriorate in transit and the more difficult it is to secure its delivery at a convenient time for the commencement of cheese-making operations. When the principal aim of the factory is cheese making, it is possible for the collection and delivery of milk to be organised so as to promote high quality in the cheese made. The radius from which supplies are drawn is kept as low as is compatible with obtaining sufficient milk to enable the factory to work economically. Where the factory is mainly concerned with the supply of milk to the fluid milk market, the radius from which supplies are drawn may be wider, without detriment to the main business of milk selling, especially when the milk is treated by heat before re-dispatch. In these circumstances, however, the milk supplies are not of the most suitable quality for cheese manufacture ; it is rarely that milk from the nearer farms is specifically allocated to cheese making. Moreover, owing to uncertainty as to the quantity of milk that may have to be converted, cheese manufacture is more difficult to organise in respect of both plant and labour than in the specialised cheese factory. The farmer-owned surplus-milk depot is under even greater disability in regulating its cheese-making process; as the factory exists for the convenience of producers, it may have to accept supplies even more irregularly and from even greater distances.

So far as the condition of the milk and the time of delivery are concerned, the ideal method of securing supplies is for each farmer to deliver his own milk at the factory. This has the advantage that defective quality can be definitely brought home to the producer concerned. Such a system may, however, be uneconomical, particularly when supplies are drawn from a wide radius ; the collection of milk from the farm, either by an independent contractor or by the factory, is therefore often adopted to save costs. The weakness of this latter method is that it is not feasible to check the quality of the milk in the producer's presence.

The factory cheese-maker endeavours, by taste and smell, to ensure that the raw material is in good enough condition for cheese making ; he may also call to his aid the acidimeter and the sediment test. It is impossible, by these methods, however, to fix a clear dividing line between the fit and the unfit, and, in consequence, the rejection of milk may be hard to justify ; there is, therefore, a tendency to accept all that is not palpably unusable. The manager of a farmers' co-operative factory has the further well-recognised difficulty in this connection of being the servant of those who supply the milk to the factory.

To overcome the difficulty of obtaining and maintaining supplies of milk in suitable condition for cheese making, the practice of pasteurising the raw material on receipt has been adopted in some factories. In this way, not only is greater uniformity of product obtained but the daily routine of the factory is facilitated. It is contended, however, with some justification, that the quality of the cheese made from pasteurised milk is not as fine as that made from untreated milk which has been produced and handled under conditions of cleanliness.

The importance of high butter-fat content in milk, both in securing a high yield and a good quality of cheese, has led many factories to adopt schemes of payment for supplies on a basis of butter-fat content. Where this is the practice, the basis of payment may be the weight of butter-fat supplied, irrespective of the volume of milk. Alternatively, a basic price may be paid per gallon of milk of a specified standard of fat-content, with deductions or bonuses as the fat percentage falls below or rises above the standard. Such schemes, however, are more commonly in operation in Scotland and in overseas countries than in England and Wales, where the normal practice is to pay a flat rate for all supplies that conform to the legal presumptive standard of 3 per cent. fat.

Many farmers are opposed to the method of payment on a butter-fat basis. Under this method, they have to rely on the analysis carried out by the factory for the determination of the butter-fat content of their milk ; the volume of their supplies, on the other hand, is something which they themselves can check. Where the factory is co-operatively owned by the milk suppliers, payment on a butter-fat basis is the logical method.

CHAPTER IV.—SUPPLIES.

(i) Home Production.

(*a*) *Quantities.*—Exact statistical records of the production of cheese in this country are not available. The most recent official estimate* of the production of cheese on *farms* in England and Wales is for the year ended 4th June, 1925, when it was computed at about 502,000 cwt., of which some 21,000 cwt. were consumed in farm households, leaving a balance of 481,000 cwt. available for sale. Corresponding figures for Scotland† show that the farm production of cheese in that country in the same year was about 145,000 cwt., consumption on farms 10,000 cwt., and sales off farms 135,000 cwt. Thus, the total estimated production of cheese on farms in Great Britain in 1925 was about 647,000 cwt. and the quantity sold off farms was about 616,000 cwt.

The most recent estimate of production of cheese in *factories* in Great Britain is for 1924.‡ Table I, page 145, shows the total estimated factory output for that year, distinguishing between cheese produced in creameries and factories and cheese made by dairy firms whose principal business is the sale of liquid milk. The total amounted to about 210,000 cwt.

The trend of production of cheese in Great Britain since pre-War days appears to have been upwards. The post-War production of cheese in Great Britain—857,000 cwt. per annum in all, on the basis of the 1924-5 figures—appears to be 120,000 cwt. or over 15 per cent. above the corresponding figures recorded in the 1907-8 Censuses of Production, the increase being in the factory output.

(*b*) *Exports.*§—It will be seen from Table II that the quantity of home-produced cheese exported from the United Kingdom annually up to and including 1924 was relatively insignificant, amounting only to about 7,500 cwt. in that year. A considerable increase took place, however, between 1925 and 1927. In the latter year, nearly 48,000 cwt. were exported. Since that date, exports have continued on the up-grade, reaching 57,000 cwt. in 1929.

Most of the home-produced cheese exported consists of Cheddars, Stiltons and Wensleydales, the destinations being America, Germany and eastern countries such as Egypt and India. The increase in exports in recent years is largely due to heavier ship-

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* The Agricultural Output of England and Wales, 1925. Cmd. 2815/1927.

† The Agricultural Output of Scotland, 1925. Cmd. 3191/1928.

‡ Third Census of Production, 1924. Preliminary Report No. 19, The Board of Trade Journal July 21st, 1927.

§ After 1st April, 1923, the figures relate to Great Britain and Northern Ireland only.

ments of hard varieties of cheese to foreign as distinct from Empire countries, but is partly accounted for by exports of processed cheese, much of which is made from imported bulk cheese.

Exports amounted in 1925 to only about 2 per cent. of the total home production. On the assumption that the present output of cheese is approximately the same as in 1925, exports in 1929 would appear to have represented some 6 to 7 per cent. of the total production.

(*c*) *Periodicity.*—The bulk of the home-produced cheese is made during the months of April to September inclusive, with the greatest output during the months of June to August. The majority of farmers who specialise in cheese making arrange to have their cows calve in the spring and to dry them off in the late autumn. This practice is common particularly in the south-western area among Cheddar cheese-makers, and, to a less degree, in the north-western area among Cheshire cheese producers. With the latter, however, the tendency is to make cheese throughout the year, the greatest activity, of course, being in the summer months; during the winter, their daily output is probably about one-third of their daily summer manufacture, unless supplies of fluid milk are short, when cheese making may be discontinued and the milk diverted to the fluid market. In Lancashire, production is chiefly confined to the summer months, though a few makers of Lancashire cheese continue operations during the winter. For reasons already explained,* the manufacture of Caerphilly cheese probably shows less seasonal fluctuation than that of any other variety; its peak of production is nevertheless in the summer. Where there is a surplus of milk in winter above the requirements of the fluid milk market, cheese manufacture is generally the outlet for it.

(*d*) *Rate of Marketing by the Producer.*—It is impossible to estimate accurately the amount of home-produced cheese marketed at different seasons. A rough index of the rate of disposal is provided by the quantities handled at various cheese fairs throughout the country. The quantities of cheese pitched at Highbridge, Preston, Nantwich, Chester and Whitchurch fairs during the year 1929 are shown in Diagram A (opposite page 32). The first may be taken as representative of the seasonal marketing of Caerphilly cheese, the second of Lancashire cheese and the last three of Cheshire cheese. The Diagram cannot be taken as an indication of seasonal variations in consumer-demand since no account is taken of storage by distributors after purchase.

The flow to market of Caerphilly and Lancashire cheeses, both of which are short-keeping varieties, naturally follows somewhat closely the season of manufacture. Thus, the disposal of Caerphilly is fairly regular throughout the year, with some increase in

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* *See* page 16.

sales in summer, while Lancashire cheese is marketed in much greater quantities in summer than in winter. In the case of Cheshire cheese, the Diagram is not representative of the rate of disposal in October and November owing to the abnormally high quantities offered at the annual cheese shows held in conjunction with the fairs during those months. Allowing for this factor, the Diagram shows that the season of heaviest disposal is from May to September, with a sharp decline after the annual cheese shows to a winter minimum and with steadily increasing quantities after February.

(ii) Imports.*

(*a*) *Quantities.*—The development of imports of cheese into the United Kingdom during the latter half of last century is shown by the following figures :—

Year.	*Imports.* Cwt.
1840	226,000
1850	348,000
1860	583,000
1870	1,041,000
1880	1,776,000
1890	2,144,000
1900	2,706,000

From 1840 until the end of the century, each decade showed a big increase in the quantities imported, the most rapid increase occurring between 1860 and 1880 and practically coinciding with the introduction of the factory system in America.

Of greater immediate interest, however, are the figures relating to the present century. These, together with the re-exports and the balance of imports retained for home consumption, are shown, by quantity and value for each year from 1901 to 1913 and from 1922 to 1929 inclusive, in Table III., page 147. The following figures summarise the general trend :—

Year.	*Imports.* Cwt.
1901	2,587,000
1913	2,297,000
1922	2,659,000
1929	2,994,000

In contrast with the increase in imports which occurred during the second half of last century, a slight falling off took place on the whole in the quantities imported between 1901 and 1913, notwithstanding the increase in population during that period. Since the War, the trend has been again upward. Not only have the average quantities imported annually been greater than in pre-War

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* After 1st April, 1923, the figures relate to Great Britain and Northern Ireland only.

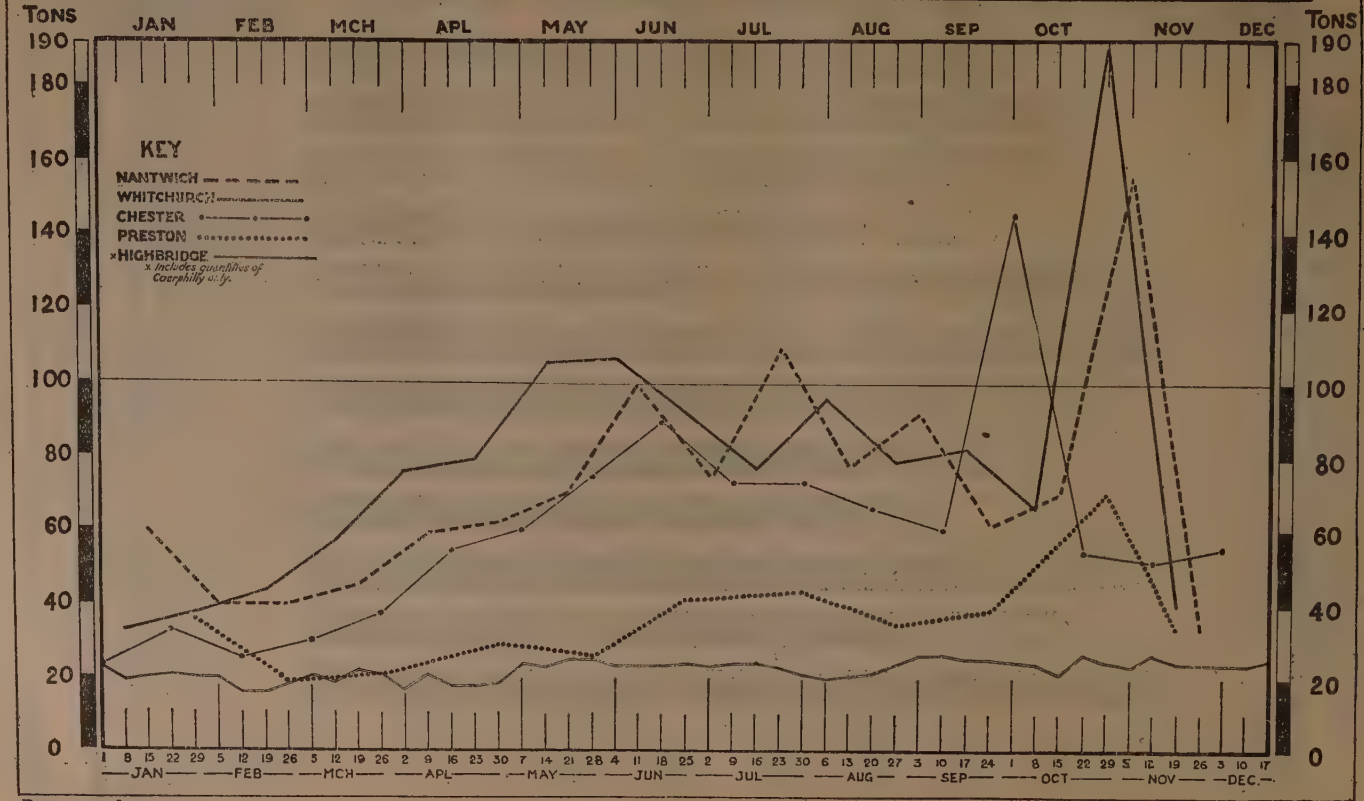
times, but from 1922 to 1925 there was a gradual increase up to a maximum, in the latter year, of over 3 million cwt., at which figure imports have since remained more or less stationary.

(*b*) *Sources.*—The countries from which the British market has obtained its imported supplies of cheese from 1900 to 1929 are shown in Table IV., which gives the average quantities imported annually from each country for four 5-year periods ended 1904, 1913, 1924 and 1929 respectively. It will be seen that the Empire has always contributed a larger proportion of the imports than foreign countries and that Empire supplies increased from 67·8 per cent. of the total imports in 1900–4 to 88·4 per cent. in 1920-4. This was due not only to an increase in the actual quantities imported from Empire sources, but also to a decrease in those obtained from foreign countries. In the years 1925–9 there was a slight drop in the proportion of imports from Empire countries, mainly due to an increase in the quantities arriving from the Netherlands and Italy.

At present, the two main sources of imported cheese are New Zealand, which in the 5-year period 1925-9 supplied annually an average of 1,571,000 cwt. or 52·2 per cent. of total imports, and Canada, from which were obtained during the same period an average of 959,000 cwt. or 31·8 per cent. The Netherlands with 197,000 cwt. (6·6 per cent.) and Italy with 143,000 cwt. (4·7 per cent.) are the only other countries supplying any considerable proportion of the imported supplies. These four countries between them account for over 97 per cent. of our total imports. Apart from New Zealand and Canada, the only other Empire sources of supply are Australia, the Irish Free State and South Africa, but these together have never provided more than 3 per cent. of the imports. Small quantities of cheese are also obtained from the United States, France, Switzerland, Belgium, Finland and Denmark.

Since the beginning of the present century, considerable changes have taken place in the relative importance of the main sources of supply. The principal change has been the great increase in New Zealand supplies and the decline in those from Canada. At the beginning of the century, Canada was the mainstay of the import trade, supplying over 1,700,000 cwt. per annum—about two-thirds of the total imports. New Zealand provided an almost negligible quantity—only 70,000 cwt., or less than 3 per cent. With the development of dairying in New Zealand, however, imports from that country rapidly increased, while at the same time those from Canada declined. In the five years ended 1913, however, while New Zealand's share in the total imports had increased to 462,000 cwt. per annum, Canada was still sending 1,459,000 cwt. Since the War, the relative importance of these two sources of supply has become reversed; imports from New

QUANTITIES OF CHEESE PITCHED AT CERTAIN CHEESE FAIRS IN 1929


TONS
JAN FEB MCH APL MAY JUN JUL AUG SEP OCT NOV DEC
190
180
160
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120
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80
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KEY
NANTWICH
WHITCHURCH
CHESTER
PRESTON
×HIGHBRIDGE
× Includes quantities of Caerphilly daily.
1 8 15 22 29 5 12 19 26 5 12 19 26 2 9 16 23 30 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17
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DIAGRAM A.

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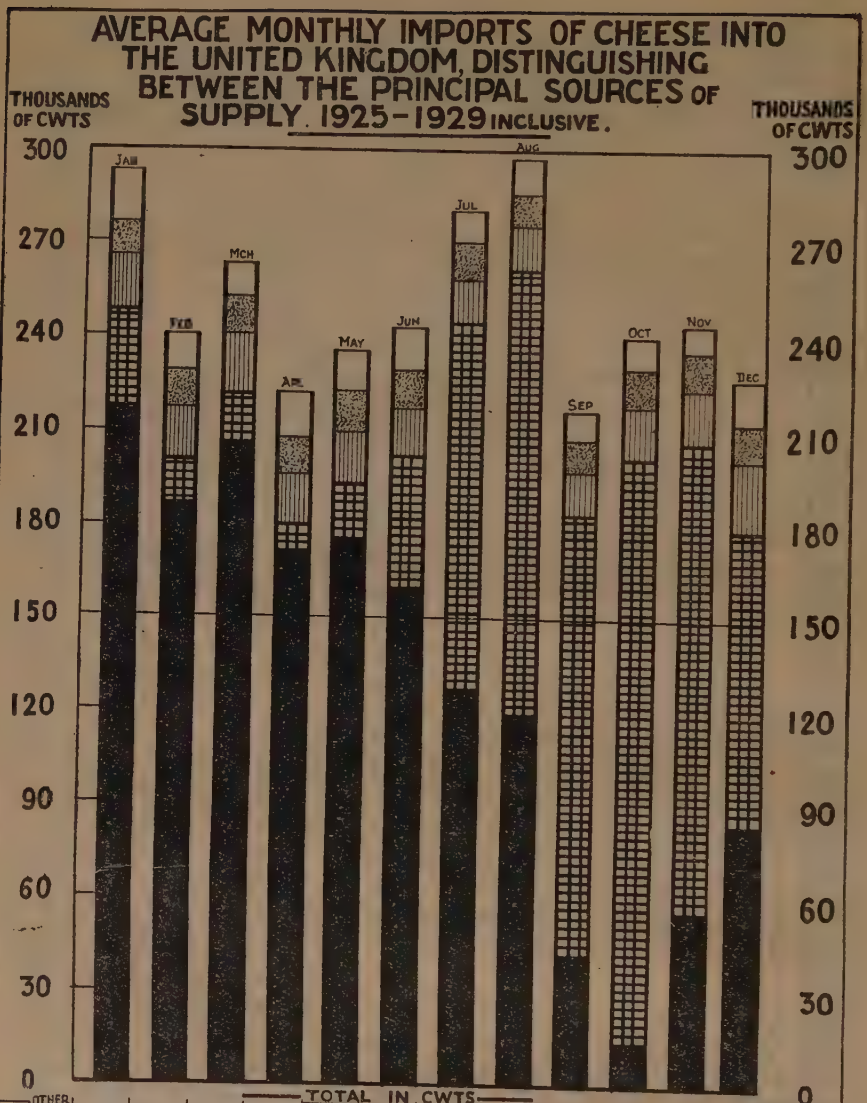

	TOTAL IN CWTS												
OTHER COUNTRIES.	16.601	11.156	11.433	14.834	12.894	14.172	9.996	12.695	9.616	9.646	7.823	14.217	OTHER COUNTRIES.
ITALY	11.269	11.799	12.438	11.713	13.369	12.177	12.644	10.624	10.215	12.682	12.757	11.795	ITALY
NETHERLANDS	17.075	16.490	19.227	16.264	16.416	15.065	14.165	13.022	13.889	16.041	17.273	21.937	NETHERLANDS
CANADA	30.245	13.413	14.651	7.739	16.578	43.003	118.057	142.157	141.707	187.594	149.984	94.125	CANADA
NEW ZEALAND	218.289	187.590	207.542	172.269	176.329	159.832	127.681	119.664	42.355	14.856	57.007	85.005	NEW ZEALAND
TOTAL	293.479	240.448	265.291	222.819	235.586	244.249	282.543	298.162	217.782	240.819	244.844	227.079	TOTAL

DIAGRAM B.

Zealand have further increased, and the decrease in those from Canada has continued, so that, in the 5-year period 1925–9, New Zealand supplied from 60 to 70 per cent. more cheese than Canada, while in 1929 imports from New Zealand were more than double those from Canada. The relative position of foreign countries as contributors to the British market has also altered. The most notable change is the decrease in supplies from the United States from 439,000 cwt. per annum, or almost 17 per cent. of total imports in the five years ended 1904, to 12,000 cwt. per annum, or less than 1 per cent. in the five years ended 1929. The quantities shipped from the other foreign sources of importance, except those from Italy, have also generally shown a downward trend during the present century, a tendency which was probably stimulated by the War.

(*c*) *Periodicity.*—Table V, page 149, shows the total monthly imports of cheese into the United Kingdom from 1923 to 1929 inclusive, with the average imports for each month over the whole 7-year period. Cheese imports as a whole are subject to varying monthly fluctuations, different years showing different months of maximum importation. This may be accounted for, to some degree, by the chance arrival of cargoes. The Table indicates a tendency for total imports to increase in July and August and to decrease towards the end of the year. At other times, supplies are relatively steady.

Diagram B shows the average monthly arrivals of cheese during the period 1923–9, both in total and from each of the principal countries of origin. It will be seen that imports from the two main sources of supply—New Zealand and Canada—show very marked seasonal fluctuation. In the first half of the year, supplies from Canada are at their lowest, while New Zealand supplies are at their maximum. In the second half of the year, imports from New Zealand begin to fall off and from September onwards are at their lowest, while the importation from Canada reaches its maximum during this period. The alternation of the peak periods of imports from these two countries maintains something approaching stability of supplies throughout the whole year, the rise in July and August being due to overlapping in the periods of maximum importation from these sources. Imports from all other countries show a remarkable uniformity throughout the year.

(*d*) *Note on the Trade of the Chief Supplying Countries.*—A brief description of the cheese trade of the principal countries supplying the United Kingdom will be of interest.

New Zealand.—The introduction, in 1882, of refrigeration as an aid to ocean transport, stimulated the dairy industry of New Zealand by enabling it to take advantage of overseas markets for its cheese. Returns from cheese factories show that the

quantity manufactured during the twelve months ended 31st March, 1928, was 1,550,090 cwt. Exports during the calendar year 1928 amounted to 1,567,272 cwt. The supreme importance of the United Kingdom as a market for the export trade of the Dominion may be gauged from the following figures :—*

Year.	*Total Exports of Cheese from New Zealand.*	*Exports to United Kingdom.*
	Cwt.	Cwt.
1904...	84,526	82,046
1908...	280,798	276,212
1913...	611,663	608,933
1923...	1,441,460	1,428,762
1927...	1,492,792	1,478,870
1928...	1,567,272	1,551,523

Butter as well as cheese is produced on a large scale in New Zealand and many factories are equipped to turn out both ; the output of each may, therefore, vary according to circumstances. Extensive changes have, in fact, taken place in the relative importance of butter and cheese exports. They were about equal until 1895. During the period 1896–1907, the exports of butter assumed the lead ; in 1903, nearly four times as much butter as cheese was exported. Thereafter, cheese exports increased so rapidly that in 1919 they were nearly five times as great as those of butter. Since the War, butter exports again increased and more than trebled during the four years 1919–22, until in 1922 the quantities of butter and cheese exported were once more approximately equal. Since 1922, exports of cheese have always exceeded those of butter.

Canada.—In Canada, a rapid expansion in cheese production followed the institution of the factory system about 1864 ; as a result, the cheese industry became more and more dependent on outside markets. Production increased to a maximum of over 2 million cwt. in 1904, since when it has gradually fallen off to the present output of about 1¼ million cwt. The rapidity with which the export trade developed at the end of last century is indicated by the fact that whereas, in 1893, cheese exports amounted to 1,195,949 cwt., they had reached the record figure of 2,083,030 cwt. in 1904.

The United States market, on which the industry at first mainly relied, was gradually narrowed and finally cut off in 1891 by tariff restrictions. Exports were in consequence diverted to

* New Zealand Official Year Book.

the United Kingdom. The importance of this country as an outlet for Canadian cheese is shown by the following figures* :—

Year.	*Total Exports of Cheese from Canada.*	*Exports to United Kingdom.*
	Cwt.	Cwt.
1908...	1,693,843	1,685,921
1913...	1,385,861	1,373,990
1923...	1,145,489	1,065,504
1928...	1,019,219	924,252

The increase in internal demand, accompanied by a considerable drop in the cheese output, has caused a steady decline in total exports from Canada since 1904. As with those from New Zealand, Canadian exports are largely of the Cheddar type of cheese, though "processed" cheese, which was, apparently, first produced in Canada on an extensive scale, has lately been a feature.

The Netherlands.—The Netherlands rank with New Zealand and Canada as one of the three largest cheese-exporting countries in the world. Production has been increasing since the earliest date—1903—for which definite records exist; it has now reached over 2 million cwt. per annum, the principal producing areas being South Holland, North Holland, Utrecht and Friesland. In the first three districts, cheese making is mainly a farmhouse occupation, but in the northern province of Friesland, where the bulk of the cheeses other than those of the "full-fat" description are made, it is conducted wholly on a factory scale.

The export trade of the Netherlands is of long standing, having exceeded 350,000 cwt. annually since 1850. The following figures† indicate the growth of exports since the War and the proportion of total exports which is sent to this country :—

Year.	*Total Exports of Cheese from the Netherlands.*	*Exports to the United Kingdom.*
	Cwt.	Cwt.
1920...	891,000	115,000
1925...	1,569,000	142,000
1927...	1,915,000	228,000
1928...	1,812,000	228,000
1929...	1,886,000	196,000

The principal receiving countries are, in order of importance, Germany, Belgium, the United Kingdom and France.

*Canada Year Book. †Jaarstatistiek van den In-, Uit-, En Doorvoer.

The quantities of the different varieties of cheese exported to the United Kingdom are shown in the Table below.* The exports consist mainly of the Gouda and Edam varieties. Of recent years, however, exports to the United Kingdom have included increasing quantities of cheese of Cheshire and Cheddar types and also of processed cheese, which, together with all other varieties, are shown in the Table under the general designation of " Other kinds."

Exports to United Kingdom.

Year.	Gouda.	Edam.	Other kinds.
	Cwt.	Cwt.	Cwt.
1925	46,000	55,000	41,000
1926	51,000	72,000	67,000
1927	52,000	68,000	108,000
1928	47,000	65,000	116,000
1929	43,000	68,000	85,000

It will be seen that the imports into the United Kingdom of Gouda and Edam varieties together have been relatively uniform each year since 1925, the increase in the total up to 1928 being entirely accounted for by " other kinds."

Italy.—The dairy industry of Italy has largely specialised in the manufacture of cheese. Italy is, in fact, one of the principal cheese-producing countries of the world, cheese being an important article in the diet of the Italian people. The total output in 1925 was estimated at about 5 million cwt.† Prior to 1894, imports of cheese into Italy exceeded exports, but this position was subsequently reversed. With the exception of a falling off during the War, exports steadily increased, as the following figures show, until 1925 :—

Year.	*Total Exports of Cheese‡ from Italy.*	*Exports to the United Kingdom.§*
	Cwt.	Cwt.
1905...	337,000	84,000
1915...	587,000	76,000
1925...	770,000	161,000
1926...	651,000	141,000
1927...	626,000	141,000
1928...	718,000	142,000

* Jaarstatistiek van den In -, Uit -, En Doorvoer.
† The Italian Exporter, No. 7; Rome, August, 1927.
‡ Movimento Commerciale del Regno d'Italia.
§ Annual Statement of Trade of the United Kingdom.

The principal market for Italian exports of cheese is the United States, after which comes the United Kingdom, which has absorbed in recent years some 20 per cent. of the total and is the principal market for softer varieties of Italian cheese, the chief of which is Gorgonzola.

(iii) Total Supplies.

(*a*) *Quantity.*—The following Table indicates that the total supplies of cheese available annually for consumption in Great Britain have increased from about 3,064,000 cwt. before the War to 3,725,000 cwt. in recent years.*

Estimated Supplies of Cheese Available for Consumption in Great Britain.†

	Pre-War.		Post-War.	
	Quantity.	Percentage of total supply.	Quantity.	Percentage of total supply.
	Cwt.		Cwt.	
Home Production	737,000	24	857,000	23
Imports	2,327,000	76	2,868,000	77
Total supply ...	3,064,000	100	3,725,000	100
Supply per head of population ...	8·7 lb.	—	9·5 lb.	—

The expansion has been largely in imported supplies, which increased from an average of 2,327,000 cwt. per annum to one of 2,868,000 cwt. per annum during the period. The proportion of imported supplies, however, was approximately the same both before and after the War—viz., rather more than 75 per cent. of the whole.

The total supplies available for consumption have increased not only absolutely but also in relation to the population. In the pre-War period, the average supplies represented a *per capita* consumption of 8·7 lb. per annum, compared with 9·5 lb. per annum in the post-War period.

(*b*) *Value.*—The total value of all cheese available for consumption in Great Britain annually in the post-War period is estimated at roughly £17,751,000 per annum, of which home-

* The pre-War figures refer to the period 1905-9; the post-War figures to the period 1924-7.

† From "The Agricultural Output and the Food Supplies of Great Britain, 1929."

produced supplies comprised £4,270,000, while the value of net imports amounted to £13,481,000. Of the home-produced cheese, farm-made cheese amounted to £3,300,000 and factory cheese to £970,000.

CHAPTER V.—DEMAND.

(i) Consumption.

(*a*) *General.*—The annual consumption of cheese per head of population in Great Britain is compared in the following Table with that in a number of other countries :—

Country.	*Per Capita Consumption.* (lb. per annum).
Switzerland	23·3
France	13·5
Netherlands	12·3
Italy	11·8
Great Britain	9·5
New Zealand	5·8
U.S.A.	4·3
Australia	3·7
Canada	3·0

The consumption of cheese in Great Britain is intermediate between that in the important European cheese-producing countries and that in the principal cheese-producing Dominions and the United States.

The introduction of processed cheese has undoubtedly increased the number of cheese consumers, but it has also reduced the average weight of each purchase. The popularity of processed cheese is mainly due to absence of rind and to improved keeping qualities, both of which diminish waste.

(*b*) *Periodicity.*—There is little seasonal variation in the demand for cheese, with the exception of a slightly increased consumption during summer, when there is greater use of foodstuffs which do not need cooking and when cheese, therefore, to some extent, replaces meat. The generally lower level of cheese prices during summer* also somewhat stimulates consumption during that season.

There is some increase in the consumption of certain varieties of cheese during the Christmas season. This is particularly the case with Stilton and blue Wensleydale. About 90 per cent. of the retail sales of Stilton take place, in fact, about Christmas time, and there is a widespread belief that Stilton cheese is not "in season" at other times of the year. The highest quality Stilton is the most expensive of home-produced cheeses and is a luxury product. This leads the makers to concentrate on production for the Christmas market, when luxury foodstuffs are in

* *See* Chapter VI.

keenest demand. Supplies are in consequence short at other seasons. In some years and at certain seasons—in the late spring and early summer—supplies are hardly adequate to meet the fairly regular demand from clubs, hotels and liners which exists for Stilton cheese throughout the year.

(*c*) *Local Variations.*—The demand for cheese is heaviest in those districts where the mass of the population is engaged in heavy manual labour. The industrial districts of the North, the Midlands and South Wales are thus important markets for cheese, while the consumption per head of population is also high in rural areas ; the demand is for the lower-priced cheeses, which are often eaten instead of meat. Elsewhere, a greater range of varieties and qualities is in demand, but the total quantity of cheese consumed per head is less.

(ii) Market Preferences.

The demand for cheese varies from one locality to another as regards varieties and also as regards the kind, colour, flavour and texture of the same variety.

(*a*) *Varieties.*—The general preference is for cheese of local manufacture. This tendency was strengthened by conditions during the War, when home-produced cheese had to be sold as near as possible to the point of production. Broadly, Cheshire cheese sells in the north-Midlands and the North. Cheddar, both home-produced and imported, is in demand in the southern half of the country, below Wolverhampton. This preference for the local variety is to some extent modified by price. Thus, imported Cheddar cheese finds a market in the North whenever its price is several pence per pound less than that of English Cheshire. On the other hand, the latter, in spite of its lower price, is rarely substituted for home-produced Cheddar in the South, where imported Cheddar meets the demand for a low-priced article. Of the total quantity of cheese consumed in Great Britain, over 70 per cent. consists of Cheddar, either bulk or processed.

In addition to a strong local demand, there is a limited market for Lancashire cheese, as a speciality cheese for toasting, as far south as London. Caerphilly cheese is not consumed in the producing area, but is made almost entirely for the South Wales market ; small quantities are sold in the mining districts of Durham as an alternative to Wensleydales and white Stiltons. Stiltons and blue Wensleydales are sold in high-class stores throughout the country, London being the most important market for Stiltons. Gloucester and Derby cheeses, besides meeting local demand, are consigned, to some extent, to more distant markets. Gloucester cheese is sold in high-class stores in London, Birmingham, Manchester and several other towns. Derby cheese has an isolated area of popularity in East Anglia, at Ipswich in

particular ; this market, however, is gradually declining in importance. The demand for Leicester cheese is practically confined to the producing area. The Dorset Blue Vinny cheese is in demand in Dorset and the neighbouring counties, particularly along the coast. With the development of milk selling in Dorset, the production of this variety is declining.

The demand for certain varieties of cheese appears to be largely a matter of habit and is only kept alive by the maintenance of a continuous supply. A long break in production would be sufficient to destroy the demand beyond the possibility of revival. Thus, a once popular type of Derby cheese in which herbs were mixed—"sage cheese"—was not manufactured during the War. Five years later, an attempt to re-introduce it failed ; the demand no longer existed.

In some districts, owing to the replacement of cheese making by milk selling, the demand for the local variety is not fully satisfied. This is the case with Leicester cheese which, in consequence, realises comparatively high prices in and around the city of Leicester ; the demand has been sensed by the cheese factories in Friesland and small quantities of Dutch Leicesters have been imported in recent years. Similarly, a shortage of Derby cheese occurs when the milk-collecting depots, where the variety is chiefly made, are able to dispose of their milk supplies through more profitable outlets than the cheese market.

Imported Cheddar, as already stated, is consumed to a greater extent in the South than in the North. The market for imported Cheshire coincides broadly with that for the home-produced variety. The consumption of Gorgonzola is practically uniform throughout the country. The southern half of the country is the most important market for other foreign varieties.

(*b*) *Colour and Quality.*—Marked local preferences exist as regards colour in cheese. In London and South Wales, for example, the demand is chiefly for uncoloured cheese, whereas in Birmingham and Newcastle, a deeply coloured cheese is required.* A recent investigation carried out by the Empire Marketing Board in London† showed that of 355 shops stocking bulk cheese of the Cheddar type, 65 per cent. stocked white Cheddar only, and 35 per cent. stocked both white and coloured Cheddar. Very few shops were found stocking only coloured Cheddar. Colour preference varies, however, according to the kind of cheese ; thus the most popular colours in any one district for Cheshire and Cheddar cheese respectively are not necessarily the same. Colour preference appears to be solely a matter of local custom. The colour of cheese

* *See* Linlithgow Committee Interim Report on Milk and Milk Products Cmd. 1854/1923, p. 69.

† "The Demand for Cheese in London." Report of an Investigation by the Empire Marketing Board. Report No. 22/1929.

is not connected with any quality feature, though a golden colour is often erroneously regarded as indicating richness in butter-fat.

Requirements also vary from one district to another in respect of quality factors, such as flavour, texture and maturity. Naturally, such variations are chiefly found in the case of varieties with a wide market, e.g., Cheddar, Cheshire, Stilton, Wensleydale and Gorgonzola, but the degree of variation is more marked with some kinds of cheese than with others.

There is little variation in the quality requirements for English Cheddar. Uncoloured, close-meated cheese is commonly required. Open-air workers generally prefer a somewhat stronger cheese than townspeople.

In the case of Cheshire cheese, there are numerous local variations in demand in respect of colour, texture and maturity. The colour requirements of the different consuming districts vary from white to a rather deep red. In the Potteries, where, to some extent, Cheshire cheese shares its popularity with imported Cheddar, it is required uncoloured. In Lancashire, also, a white cheese is generally preferred, but in Yorkshire, where Cheshire cheese is almost the only kind consumed by the working classes, slightly coloured cheese is in demand ; in two towns as close together as Halifax and Bradford, however, the requirements are different, white Cheshire cheese being sold in the former, nearer the Lancashire border, the coloured type in the latter. In Newcastle-on-Tyne and the industrial areas of Tyneside and Tees-side, as well as in London, a deeper red is required than in Yorkshire.

As regards quality, some markets are more critical than others and are willing to pay higher prices for Cheshire cheese of the required type. Only matured Cheshire cheese, of fairly close texture, is saleable in London—a market which was largely lost through lack of supplies during the War but is being slowly regained.* In Newcastle and Liverpool, a comparatively high quality cheese is in demand. On the other hand, the expression " Potteries cheese " implies poor quality and reflects the demand for low-priced cheese in that area. Even in the Potteries, however, a definite type—a white, loose-textured cheese with an acid flavour—is required, and it is difficult to sell other types even at a low price.

In the West Riding of Yorkshire, a crumbly (" merly ") textured cheese—known in the trade as a " Yorkshire " curd—is required. Here, again, the local taste for this type of Cheshire cheese is so marked that other types are difficult to sell in this area.

Cheshire cheese which has developed blue mould, though keenly sought by the high class London stores, is condemned in the North.

The demand for new Cheshire cheese—in which acidity makes up for lack of flavour—is characteristic of certain markets. It may bring the producer a rapid turnover but it opens the door in winter to

* *See also* " The Demand for Cheese in London." E.M.B. Report No. 22.

imported cheese of Cheshire type. The disposal of a large proportion of the home make in the fresh state in summer, together with the attraction of the more profitable fluid milk market in winter, causes a shortage of home-produced Cheshire at the latter season. The available supplies consist of matured cheese and meet only a high class trade. The demand for new Cheshire in winter is therefore largely met by imported, skimmed-milk cheese of Cheshire type which can be sold at a low price, the lower butter-fat content being partly masked in winter by leaving a higher percentage of moisture in the cheese.

As previously indicated, the Stilton and the Wensleydale varieties each include cheese of two types, the white unmatured cheese and the blue-veined matured cheese. The demand for the white immature cheese of these varieties comes principally from the Midland towns and from north Durham respectively. So strong is the preference for white Wensleydale cheese in the county of Durham that 90 per cent. of the total output of this cheese, which is classified ordinarily as a blue-veined variety, is sold white and unmatured. The term " Wensleydale " in the cheese trade in the north of England definitely means white Wensleydale ; the adjective " blue " is added if the cheese is mature and blue-veined. The blue-veined cheese, which elsewhere is always higher-priced than the white type, is described by Durham consumers as " rotten " and is unsaleable in that area.

A similar difference in taste, between North and South, is found as regards Gorgonzola cheese. In London and the South, a rather soft, creamy curd with plenty of blue is preferred ; a drier, firmer cheese with rather less blue is in demand in the North.

(c) *Changes in Public Taste.*—During the present century, reflecting the general tendency towards the consumption of milder flavoured foods, there has been a marked change in public taste, particularly in the North, in favour of milder cheese. In Lancashire, for example, the adjective " tasty," as applied to Lancashire cheese, is adverse criticism. The taste for Cheddar cheese with " a bit of a bite about it," still endures, however, among agricultural workers. Well matured, home-produced cheese, such as blue-veined Cheshire, old Cheddar and ripe Stilton, still sells in the highest class retail stores at higher prices than less matured cheese, but the demand is limited. The consumption of Gorgonzola in this country, on the other hand, has increased considerably since the War ; this variety meets the demand, which still exists, for cheese of a piquant flavour at a comparatively low price. Most of the English cheeses, the Colonial Cheddars, the Dutch cheeses and the processed cheeses are now made to meet the demand for mild cheese. The change is particularly marked in the case of imported Dutch cheeses, both Edam and Gouda. Twenty years ago, England was a market for the finest quality, well matured Dutch cheese. The type now imported is that with a new

soft curd, which in Holland is not considered the best in point of flavour, and there is also an increasing importation of cheese made from partly skimmed milk. The increased consumption of processed cheese in recent years is a tendency based on quite different considerations—viz., the convenience and economy of this type of cheese together with widespread publicity.

CHAPTER VI.—PRICES.

(i) General Influences.

While it is true that home-produced and imported cheese largely supply different markets, they are, nevertheless, to some extent, interchangeable. As a result, therefore, of the high ratio of imported to home-produced supplies, the general level of prices of home-produced cheese in this country is largely set by conditions of world supply and demand.

The extent to which milk can be diverted from one channel of disposal to another is naturally limited by the necessity for specialised equipment and technical skill in the production of cheese, butter or other dairy products. Considerable variation is, however, possible, affecting the total world production and consequently the price of cheese from year to year. Farm cheese-makers in this country, for example, have always the option of selling a greater or less proportion of their milk in liquid form according to the attractiveness of the market for that commodity as compared with that for cheese. The equipment for cheese making of many of the depots of the milk distributive trade enables the trade to convert a varying proportion of its supplies of raw material, according to demand and supply in the liquid milk market. Conditions affecting the supply of New Zealand and Canadian cheese—as, for example, the extent of milk production in those countries and the attraction of other outlets either for their milk or their cheese—have a particularly important influence on the prices of cheese on the United Kingdom market.

Canada is equipped for both cheese and butter making and is thus able to vary its production of each commodity within wide limits. The changes which have taken place in the past in the relative importance of the two processes in New Zealand, for example, have been indicated.* On the other hand, several of the principal butter-producing countries, e.g., Denmark and the Irish Free State, concentrate almost solely on that product, and this to some extent limits the possibility of the adjustment of world supplies of milk as between butter and cheese manufacture. At the same time, the effect on the world butter market of any radical changes that may take place in the output of those countries which

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* *See* page 34.

specialise in butter production is likely to be reflected ultimately in the cheese market through the resultant adjustment of milk disposal as between cheese and butter manufacture in those countries which normally produce both commodities. The general trend of cheese prices over a period of years is, therefore, likely to be fairly closely related to those of milk and butter. Over short periods, on the other hand, there may be wide divergences in the course of prices of the three commodities.

(ii) Trend.

Diagram C, which shows the annual average prices of English Cheddar and Cheshire and Canadian Cheddar cheese from 1904–14 and from 1922–9, inclusive, with those of New Zealand Cheddar from 1922–9 and with those of imported butter* for comparison, illustrates the general similarity in the price movements from year to year of the two chief home-produced and the two principal imported varieties of cheese. Over a period of years, a close connection may also be seen between cheese and butter prices, though in individual years it is not uncommon to find a marked rise in butter prices accompanying a fall in the price of cheese or vice versa—e.g., 1908, 1924.

From the beginning of the present century up to the War, the trend of both cheese and butter prices was gradually upwards. Since the War, prices have been on a considerably higher level, with a tendency to fall, on the whole, since 1923. Throughout the century, however, the rise in cheese and butter prices has been merely commensurate with that of commodity prices generally, as is indicated by the following figures, which show the actual and percentage rise in prices of the cheese and butter included in Diagram C, with the exception of New Zealand Cheddar, compared with the rise in the general price index number in each of the three five-year periods 1904–8, 1909–13 and 1923–7 :—

Period.	General Price Index.†		English Cheddar.		English Cheshire.		Canadian Cheddar.		Imported Butter.*	
	Actual.	Percentage Increase.	Price per cwt.	Percentage Increase.	Price per cwt.	Percentage Increase.	Price per cwt.	Percentage Increase.	Price per cwt.	Percentage Increase.
			s. *d.*		*s.* *d.*		*s.* *d.*		*s.* *d.*	
1904–8 ..	74½	—	68 0	—	64 2	—	58 0	—	112 0	—
1909–13..	80½	8	74 3	9	66 1	3½	63 10	10	120 7	8
1923–7 ..	130½	63	124 0	67	105 8	60	104 4	63	192 3	60

* Average of Danish and New Zealand.
† Sauerbeck's.

ANNUAL AVERAGE PRICES OF ENGLISH FARMHOUSE CHEDDAR & CHESHIRE & CANADIAN CHEDDAR CHEESE & IMPORTED BUTTER FROM 1904 - 1914 AND 1922 - 1929 INCLUSIVE AND OF NEW ZEALAND CHEDDAR CHEESE FROM 1922 - 1929 INCLUSIVE.

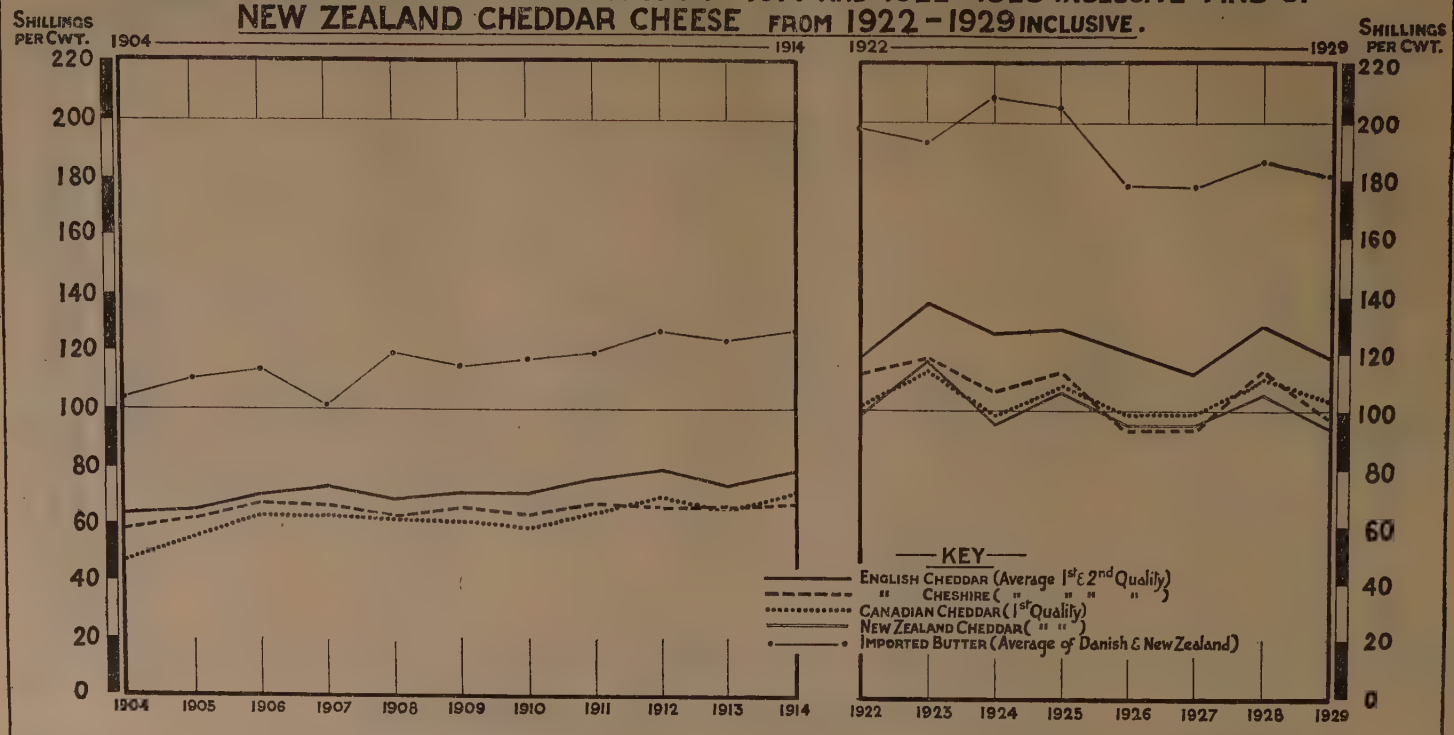

DIAGRAM C.

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AVERAGE MONTHLY WHOLESALE PRICES OF CERTAIN VARIETIES OF CHEESE, 1923–1929 INCLUSIVE. (1)

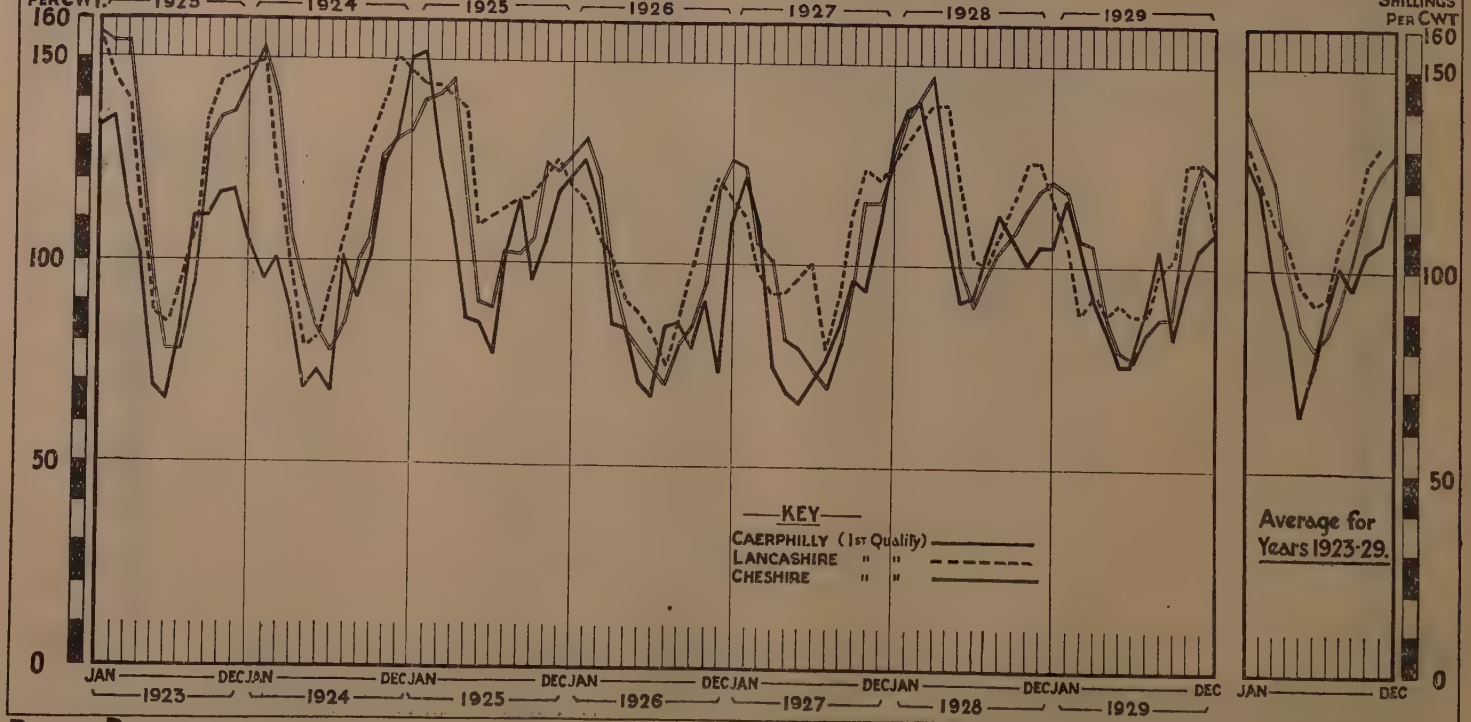

DIAGRAM D.

As Diagram C shows, the price fluctuations of both English and imported cheese since 1922 have been wide. A sharp rise in 1923 was followed by a general fall in 1924. The fall was checked and there was a recovery in 1925. Subsequently, however, when the New Zealand Dairy Produce Control Board abandoned its price-fixing operations and its accumulated stocks came on to the market, prices fell to the lowest level that had been reached since the War. A sharp rise in price again occurred in 1928, which, however, was not maintained in 1929.

(iii) Varietal Prices.

A comparison of the wholesale prices of certain varieties of home-produced and imported cheese in 1929 is given in Table VI. The figures in the Table may be regarded as representative, on the whole, of the normal position of each variety in the scale of prices.

(*a*) *Home Produce.*—The price-range between varieties in any season is, naturally, influenced by the extent of production of each variety during that season. In the main, however, differences in the average price of varieties of whole-milk cheese are associated with differences in cost of production arising mainly from the relative length of the storage period. Prolonged storage entails loss of weight through evaporation, and is attended by the risk of development of inferior quality ; it also involves increased accommodation and attention as well as the temporary sterilisation of capital. Thus, matured Cheddar and Cheshire cheese realise higher prices than cheese of early ripening types, while the finest Stiltons and blue Wensleydales, of which varieties a high proportion develop faults during the prolonged ripening process, are the highest in price of all home-produced cheeses.

At the lower end of the price scale for farm-made cheese, come the Caerphilly, white Stilton, white Wensleydale and early ripening Cheshire cheeses, all of which are consumed within a few weeks of manufacture. With these short-keeping varieties, the output of cheese per gallon of milk is greater as a result of the higher percentage of water which can be incorporated, and much of the cost of storage is eliminated. Although short supplies in the winter cause the prices of these varieties to rise, for a short period, as high as those of the longer-stored, hard-pressed varieties, their annual average prices are lower. The Derby and Lancashire cheeses are intermediate in price between the longer-stored cheeses and the earlier-ripening cheeses. The price of Leicester cheese at certain seasons exceeds that of Cheddar on account of the insufficiency of supplies to meet the keen local demand (see page 40). Prices of soft cheese vary widely according to the local demand and the percentage of butter-fat in the cheese.

Home-produced factory-made Cheddar cheese realises from 2*d.* to 5*d.* per lb. less than English farm-made Cheddar.

(*b*) *Imports.*—Over a period of years, the wholesale price of Canadian Cheddar cheese is generally higher than that of the New Zealand product—as much as 2*d.* per lb. at certain seasons. Further down the price-scale are the Dutch varieties, Gouda and Edam, the prices of the different grades of these cheeses decreasing with the butter-fat content. The prices of imported cheeses are generally lower than those of the corresponding varieties of home-produced cheese ; thus during 1929, Canadian Cheddar realised from about 1*d.* to 3*d.* per lb. less than English farm-made Cheddar, while Gorgonzola realised from about 6*d.* to 10*d.* per lb. less than blue Stilton. Both Canadian and New Zealand Cheddar, however, realise higher prices than English factory Cheddar, the price of which is usually about 1*d.* per lb. less than that of the New Zealand product. The price of Colonial Cheddars is of considerable importance to milk producers as a whole in this country, in that the monthly average price of Canadian and New Zealand Cheddar is used as a basis for the price paid for " surplus " milk under the 1930 milk price settlement arranged by the Permanent Joint Milk Committee.

(*c*) *Inter-relation of Varietal Prices.*—Diagram C indicates the close general relation existing between the course of prices of imported cheese, as represented by Canadian and New Zealand Cheddar, and those of English Cheddar and Cheshire. Diagrams D and E, which show the monthly average prices, from 1923–9 inclusive, of Canadian and New Zealand Cheddar and of the principal home-produced varieties of cheese, indicate that, while there is this general relation, the differences in price between the principal kinds of cheese on the English market vary considerably from time to time. The general level is set by the price of imported Cheddar, which, because of its volume, dominates the market ; but, at the same time, as the Diagrams indicate, more or less independent fluctuations occur in the price of each variety. The extent of price interaction between the different types of cheese depends on their interchangeability. This is limited by the strength of the demand, in each locality, for one particular variety, but, as was pointed out in the preceding Chapter, a lower price may provide the inducement to substitute one kind of cheese for another. The weaker the local preference for any variety, the greater is the influence of the lower-priced types of cheese on the price of that variety.

Gradations of quality also limit the interchangeability of varieties and the price interaction between them. Thus, matured English cheeses of the finest quality are little affected in price by temporary changes in the price levels of imported cheese ; Diagrams D and E indicate a number of years when English Cheddar prices have fallen rapidly while a rise was taking place in those of Colonial Cheddar ; this is, in fact, frequently the case in July and August. The influence of the prices of imported cheese is rather to be seen upon the prices of the lower quality farm-made

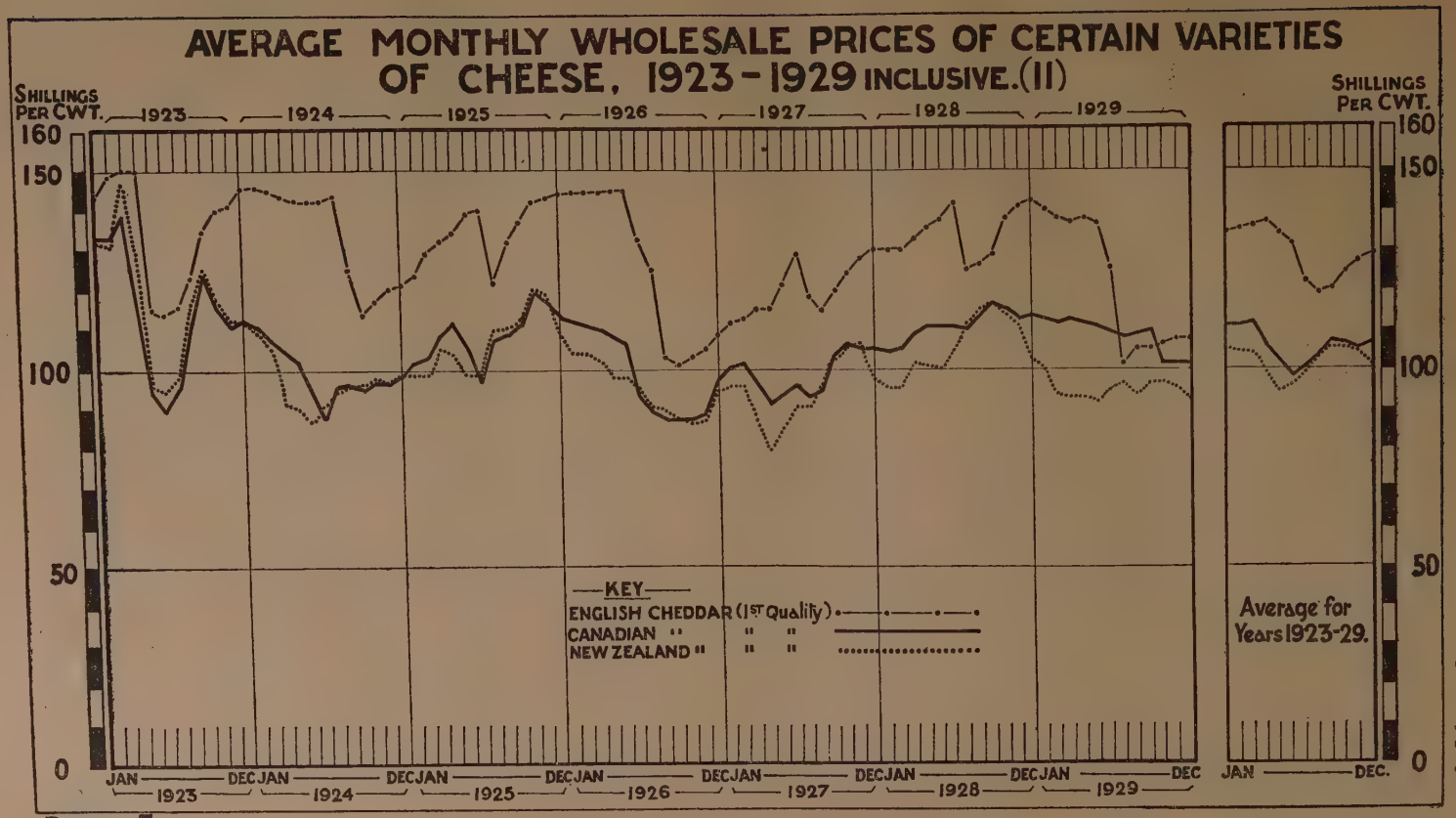

DIAGRAM E.

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and the factory-made cheeses. As the margin in price between the imported and the home-produced cheese widens, so the substitution of the former for the latter by consumers increases. The price of imported Cheddar thus acts as a drag on the prices of the cheaper home-produced varieties, particularly the inferior qualities of Cheddar. Its influence is not so great in the north of England. Though imported Cheddar is saleable to some extent throughout the country, there are districts, such as the West Riding of Yorkshire and the cotton towns of Lancashire, in which it finds a relatively small sale. The price fluctuations of Cheshire and Lancashire cheeses in the North, therefore, follow less closely those of imported Cheddar. No other imported variety, except Gorgonzola, has any important effect on the prices of home-produced cheese. The relatively low price and the reliability of Gorgonzola make any English blue-veined cheese, unless of first quality, difficult to sell. There is little or no competition, however, between the imported blue-veined cheeses and the finest Stiltons and Wensleydales.

Home-produced varieties of cheese mainly supply their own particular markets and the substitution of one variety for another under the influence of a lower price is not general. The price of early-ripening Cheshire, however, the demand for which is fairly general throughout the north of England, has some influence on those of similar cheeses such as Lancashire, Wensleydale and white Stilton.

(iv) Periodicity.

Diagrams D and E show the average seasonal movements in the wholesale prices of the principal home-produced varieties of cheese, and of Canadian and New Zealand Cheddar.

(*a*) *Home Produce.*—The price of English Cheddar rises to a peak in the first half of the year when there is practically no matured English Cheddar cheese on offer by makers. The early made cheese, which is considered unsuitable for holding, comes on to the market in considerable quantities about July, causing a rapid fall in price up to about September. This fall may commence earlier or later, according to the influence of weather conditions on the quantities of milk available for cheese production. The price-margin between English and imported Cheddar is at its narrowest about September. From this time onwards, cheese of a quality suitable for storage is produced and can be liberated as required; the improvement in quality, together with the smaller supplies on offer, causes the price to rise.

The price of the more perishable Cheshire cheese follows very closely the seasonality of manufacture. The highest prices are realised in winter—from January to March, the lowest in summer —generally in June. The margin between winter and summer prices is wide. The relatively high winter price is due partly to the fact

that the cheese is then at its best as regards quality, and partly to the shortage of supplies on the market. This shortage varies according to the quantities of milk produced and the attractiveness of the fluid milk market during the preceding manufacturing season. The drop in price in summer, which from March onwards is rapid, is caused by makers—partly through a shortage of funds, partly for lack of storage space and partly to take advantage of the relatively high prices ruling in the earliest part of the year—forcing on to the market large quantities of poor quality, fresh, moisture-laden cheese, which is not suitable for storage. The price movements of Lancashire and Caerphilly cheese are similar to those of Cheshire cheese.

Although the seasonal price movements of English varieties of cheese coincide fairly closely with those of imported Cheddar, they can nevertheless be largely explained by independent conditions. The prices of imported cheese, however, act as a modifying influence. The limit of the fall in price each year is, to some extent, governed by the prevailing price of imported Cheddar. It will be seen, for example, from Diagrams D and E that in each year when the price of imported cheese fell to 90*s.* per cwt. or below, Cheshire cheese fell below 80*s.*, and Cheddar cheese below 120*s.*; when the imported Cheddar cheese fell only to about 100*s.*, the price of Cheshire cheese was held up to the 90*s.* level, and Cheddar cheese did not fall as low as 120*s.* On the other hand, the height to which prices rise at the season when home-produced cheese is in short supply is little affected each year by the prevailing price of imported Cheddar.

(*b*) *Imports.*—The seasonal movements of the prices of New Zealand and Canadian cheese are similar, though not identical; a fall in the price of both varieties occurs in the first half, and a rise in price in the second half of the year. The price thus falls during the period in which the bulk of the New Zealand cheese arrives, and rises while the Canadian cheese is coming into the country.

During the season of heaviest importation of New Zealand cheese—January to June—supplies exceed the requirements of consumers. Stocks accumulate and prices consequently decline throughout this period. New season's Canadian cheese begins to arrive before the main New Zealand supplies cease, and this tends further to force down the price, the minimum being reached, generally, in June.

Canadian imports are on a much smaller scale than those from New Zealand; in the latter half of the year—the heavy season for Canadian supplies—the market is able to absorb all that comes into the country; stocks accumulated in the first six months are also worked off. Thus, a rise in the price of imported Cheddar takes place during this season. To some extent this is probably assisted by the decrease in the quantities of home-produced cheese available in the winter.

The higher price of Canadian as compared with New Zealand Cheddar has been previously referred to (page 46). The price-margin between the two types varies with the season; it is wider in the first half of the year than during the latter six months, when there is actually little difference between the two prices, and New Zealand cheese may even at times realise a slightly higher price than Canadian. This is due to the fact that during their seasons of maximum importation, the quality of the cheese from each source is at its lowest; later, when the producing season is over, the cheese is more mature and realises a relatively higher price.

(v) Quality Differentials.

For each variety of cheese there is a considerable range of prices, based on differences of flavour, texture and appearance. Fat-content is also a basis of price differentiation in cases where cream has been removed from the milk before manufacture, and the cheese is sold under grade designations accordingly. For home-produced cheese, differential prices for grades based on butter-fat content are not quoted. As regards other quality factors, there are definite grades to which prices can be related only in respect of cheese made by members of the two English cheese-makers' federations described later.* It is true that, in the reports of cheese fairs, prices are customarily quoted for first, second and third quality cheese and for special lots and finest cheese; these terms, however, do not refer to well-recognised quality grades.

Market reports indicate that the widest differences in price between the highest and lowest qualities of home-produced cheese are realised during the season of abundant supply. This is partly because the worst cheese on the market is of poorer quality at that period than at other times and partly because there is then a poorer demand for the inferior product. Not only does the saturated state of the cheese market tend to make buyers more discriminating, but the increase in supplies is much more pronounced in respect of the lower than of the higher qualities; the comparative glut which occurs in June and July is a glut of poor cheese rather than of good quality cheese.

The widest range of prices is found with the Stilton variety. The price of the finest Stilton may be as much as two or three times as high as that of "culled" cheese. This reflects not only the extreme difference in quality between the finest and the poorest Stiltons, but also the fact that inferior Stilton has to compete with the low-priced and more reliable Gorgonzola.

(vi) Retail Prices.

Exact statistics are not available as to the retail prices of home-produced cheeses. Cheese is one of the commodities of which the

* See pages 78-81.

retail price is used by the Ministry of Labour in computing its monthly index figure of the retail prices of food, and a monthly retail price of cheese is published in the Ministry of Labour Gazette. This, however, is an average price which does not purport to refer to any specific variety.

During the producing season, the retail prices of those varieties which are marketed in relatively fresh condition follow fairly closely the prices realised by producers. In winter, however, when little cheese is made, producers' prices for these varieties are practically nominal. In the case of varieties which are kept for maturing, the retail price is influenced by the necessity for intermediate storage and is determined by the rate at which accumulated stocks flow to market. Storage by the wholesaler has, on the whole, the effect of smoothing the seasonal fluctuations in the retail price curve.

The retailer's margin has to cover waste in cutting up, as well as waste through evaporation and in "facing" the cheese. It is largely influenced by rapidity of turnover. Thus, in the case of the imported Cheddar cheese, which sells rapidly and is economical to cut up, the retailer's margin is narrower than with any English variety with the possible exception of Cheshire.

In the retail sale of Stiltons, Wensleydales and "truckle" cheeses, some reduction in price is usually made if a whole or half cheese is taken. With larger cheeses, an extra charge of 1*d*. per lb. is frequently made for centre cuts without rind.

(vii) Market Intelligence.

The large extent to which producers sell their cheese by private negotiation limits the opportunities for collecting and publishing current prices. The prices realised, as well as the quantities on offer at cheese fairs (Chapter XIII), appear in the local papers, in the Agricultural Market Report of the Ministry of Agriculture and Fisheries and in the grocery and provision trade papers. For varieties other than Caerphilly, Cheshire and Lancashire—the only varieties sold at fairs—there are no regular reports of producers' prices. Wholesale distributors' prices for Cheddar are quoted in provision-trade periodicals at London, Bristol, Cardiff and Glasgow, and for Stilton also at London. Wholesale prices for Cheshire are quoted at Liverpool, Manchester and Newcastle-on-Tyne. The prices of Canadian and New Zealand Cheddar at London, Liverpool, Bristol, Birmingham, Manchester, Cardiff, Newcastle, Hull, Glasgow and Leith, and those of Edam and Gouda and other imported varieties such as Roquefort, Gorgonzola, Gruyere and Camembert in London, are published in the trade papers. In the Weekly Dairy Produce Notes issued by the Empire Marketing Board, prices are quoted of English varieties at cheese fairs, those of English Cheddar and Cheshire, New

Zealand, Canadian and Australian Cheddar and Dutch Edam and Gouda at London and those of English Cheddar, Cheshire and Stilton at Bristol and Liverpool. A weekly account is also given in these Notes of arrivals of cheese in all ports of the United Kingdom, quantities afloat for the United Kingdom and shipments from and quantities graded in the principal exporting countries. The stocks of cheese held in store in this country are not quoted.

PART II.—PREPARATION FOR MARKET.

CHAPTER VII.—THE PROBLEM OF QUALITY.

The producer has considerably more control over the quality of cheese than is the case with many other agricultural products. Some account of the various characteristics which go to make up quality in cheese and of the influence on them of productive methods is therefore desirable.

(i) Flavour.

Commercially, the most important factor in the quality of cheese is flavour; the consumer is more concerned with this than with anything else. Each variety has its own characteristic flavour, though the differences in flavour between some varieties are scarcely distinguishable. Flavour cannot be defined in exact terms. The characteristic flavour of any variety can only be properly appreciated after considerable experience in the cheese trade, when the senses of smell and taste become trained to notice the slightest variation. Flavours are described as acid, bitter, fishy, weedy, tallowy, rancid, sweet or fruity, and sour, most of which are more or less self-explanatory; other terms such as clean, unclean, sharp, mild, strong and tainted are somewhat less definite.

Defective flavour is a term, to some extent, relative to the variety in question. Thus "tastiness" is regarded as a defect in Lancashire cheese, where it is apt to occur through the curd being carried over for too many days in order to make up a full-sized cheese, or through the excessive development of acidity in the milk before renneting.

(ii) Texture and Body.

Texture refers to the degree of compactness of the cheese-substance and should not be confused with "body"; it is akin to the "break" or "grain" in butter and is determined by the appearance of the cheese on cutting or boring. Bad texture may be caused by the action of gas-producing organisms of the coli group; it is then characterised by the formation of pin holes in the curd; or it may be caused by the action of yeasts which give rise to elliptical, "fish-eyed" holes. Insufficient pressing and lack of acidity during manufacture may produce irregular cavities which may be sufficiently large and numerous to give the whole cheese a sponge-like appearance. The texture of a cheese may be close, open, loose, porous, crumbly or flaky; in addition, various local terms—such as "merly" (crumbly) in Yorkshire—are in use.

Unlike texture, which is discernible by appearance, the " body " of a cheese is its consistency or solidity as judged by the " feel " when a piece is pressed between the fingers and thumb or when the cheese is felt externally. Body and texture are closely associated and many of the terms used to describe texture are also applied to body. Other terms, however, such as plastic, soft, pasty, hard, firm, smooth, weak and spongy, are used solely with reference to body. Each variety of cheese has its own characteristic texture and body. These features, like flavour, cannot be accurately defined, and personal judgment based on experience has to be relied upon for their assessment.

(iii) Keeping-quality.

The keeping-quality of cheese is closely connected with flavour, body and moisture-content ; good keeping-quality implies the non-development of undesirable features, particularly as regards flavour, before the cheese is consumed. The importance of keeping-quality depends upon the variety. Certain kinds of cheese, such as Caerphilly, are not intended for long keeping, but are made for consumption in the " green " state. The medium-keeping Cheshire, again, would not be expected to keep for, say, twelve months without deterioration ; the long-keeping kind, on the other hand, should be in good condition, if properly stored, even after two years.

(iv) Colour.

The colour of cheese has a definite significance on the market. Two distinct types are recognised—uncoloured and coloured ; the blue-veined cheese might be regarded as a third. The necessary shade of colour is a matter of local market requirement* but such undesirable features as mottled discoloration, spottiness and seaminess always detract from the value of the product.

The value of cheese of the blue-veined varieties is more dependent on perfection of colour than is the case with the hard-pressed cheeses. Colour is here a visible indication of flavour. On the exposed surfaces, when the cheese is cut across, blue veins of mould-growth should radiate from the centre and the curd should be white and free from yellow patches, which indicate a soft, soapy consistency and sourness ; other irregularities, such as red patches or black spots, are due to bacterial action of a kind adversely affecting flavour. Discolouration, due to uneven salting, uneven draining of whey from the curd or putting the curd into the mould before sufficient acidity has developed, is a common defect of Stilton cheese. Wensleydale cheese often fail to develop the characteristic blue mould ; this is frequently due to the development of too close a texture through excessive pressure.

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* *See* pages 40-42.

(v) External Appearance.

The shape of a cheese, the condition of the rind and the state of the bandages or wrappings, being factors of some significance to the wholesale or retail buyer, affect wholesale prices.

A cylindrical shape is common to most varieties, the dimensions varying according to the kind of cheese. Slight deviations from the normal size of the variety are of no importance but the actual shape of the cheese gives some external indication of its quality from the standpoint of flavour, texture and body. Defective quality may be evidenced not only by distortions but also by a too exact, straight-sided cylindrical shape ; the latter indicates an over-acid, hard and dry cheese, and is not, therefore, ideal. The sides should show a slight bulge, more or less pronounced according to the variety. If the sides and ends bulge so much as to give a blown appearance, however, the cheese is of low quality as regards flavour, texture and body. The blowing or puffiness of cheese is caused by gas-producing organisms, the action of which severely impairs general quality. Insufficient turning during the ripening process may result in one end being broader than the other, through the whey having drained down to the bottom. This occurs most frequently in the lightly pressed cheeses, particularly Wensleydale. The blue-veined cheeses may tend to lean from the perpendicular if the whey has drained unevenly from the curd. The quality in other respects may be superlative, but imperfect shape suggests possible abnormality and detracts from value accordingly.

The rind should be free from cracks, whey stains and, normally, mould-growth. With Lancashire cheese, in particular, evidence of external mould-growth is regarded with disfavour, since it suggests over-storing and a tendency to " tasty " flavour instead of the mild flavour which the market requires. On the other hand, with some cheeses, which are at their best after long storing, external mould-growth may be an advantage as suggesting maturity, although it is recognised that excessive mould-growth prevents the surface evaporation which is essential to the formation of a good coat or rind. More than any other type, the blue-veined cheeses suffer from defective coats caused by the depredations of cheese mites. However good the cheese may be in other respects, evidence of severe attacks by this pest tends to lower the wholesale price ; badly affected cheese lose weight in keeping, while the dusty waste, made by the bodies of the cheese mites, has a bad appearance in the shop window or on the counter. The thickness of the crust caused by the inroads of the mites also suggests waste to the consumer and hinders retail sale.

(vi) Composition.

(*a*) *Butter-fat Content.*—Owing to the differences between the moisture-content of different varieties, it is unsatisfactory to base a

comparison of the richness of cheese on the percentages of butter-fat in the bulk. The percentage of butter-fat in the moisture-free substance is a better guide ; butter-fat standards for cheese are usually fixed on this basis. The manufacture of cheese is virtually a segregation of the butter-fat and casein of the milk from the moisture, milk-sugar, albumin and ash which remain in the whey. The butter-fat content of the moisture-free substance of cheese thus varies with the proportion of butter-fat to casein in the milk used. In the process of cheese making, some fat is, however, lost in the whey, which may contain between 0·15 and 0·5 per cent. of fat, the proportion varying with the skill of the maker.

Deficiency in butter-fat detracts from the palatability of cheese. High butter-fat content is not by itself, however, sufficient to ensure high quality. The proportion of butter-fat in the moisture-free substance of all whole-milk cheeses made from milk of a normal composition falls, with few exceptions, between 45 and 55 per cent. Between these limits, variations in butter-fat content have only a slight effect on flavour and palatability. On the other hand, faulty technique may cause inferiority of flavour or texture sufficient to discount superior richness.

It is the practice of some cheese-makers to remove part of the cream, usually from the richer night's milk, for the purpose of butter making, the higher price of butter providing the inducement. The cream removed is either churned separately or is mixed with the cream skimmed from whey, in order to improve the quality of the whey butter.* As whey butter is not in this country required by law to be declared as such on sale, this addition to the whey cream enables the resulting product to pass for ordinary butter.

The economics of the practice, however, justify examination. What the cheese-maker asks himself is whether the higher price he will realise for butter-fat as butter than as cheese will more than compensate him for the loss in quality and quantity of the cheese resulting from the removal of some of the cream. He may attempt to counteract the effect of skimming by leaving a greater proportion of moisture in the curd, but increased moisture is no real substitute for butter-fat.

The following examples show the theoretical results of varying degrees of skimming on the percentage of butter-fat in the moisture-free substance of cheese. The casein in the milk is assumed in all cases to be 2·75 per cent. ; the loss of butter-fat from the original milk in the course of manufacture is also assumed to be constant. Solids other than butter-fat and casein in the moisture-free sub-

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* *See* page 140.

stance of the cheese are assumed to be constant at 5 per cent. On the foregoing assumptions, milk containing :—

2%	butter-fat	gives	37·1%	fat	in	the	moisture-free	substance of cheese.
2½%	,,	,,	43·1%	,,	,,	,,	,,	,,
3%	,,	,,	46·3%	,,	,,	,,	,,	,,
3½%	,,	,,	52·0%	,,	,,	,,	,,	,,
4%	,,	,,	55·3%	,,	,,	,,	,,	,,

The higher the proportion of casein to butter-fat in the milk, the greater is the danger that the percentage of butter-fat in the moisture-free substance of the cheese may fall excessively low through skimming. In the absence of precise knowledge of the composition of the raw material on the cheese-maker's part, skimming may, therefore, so affect the quality of the cheese that the lower price realised for it may more than neutralise the gain in value of the butter-fat abstracted.

It should be added that, on cheese-making farms, the housewife frequently depends on the sale of eggs and butter for the financing of her housekeeping. The returns from these commodities go direct into the household purse while the returns from cheese go into the farm bank account. There is, therefore, some incentive to the housewife, who is usually responsible for the cheese making, to remove as much cream for butter making as may be possible without too obvious injury to the quality of the cheese.

In the factory cheese industry in several countries—e.g. the Netherlands, Denmark and Norway—it has become an accepted but carefully controlled practice to make cheese of low fat-content from partly skimmed milk. This is sold under grade designations based on the percentage of fat in the moisture-free substance, and no attempt is made by the manufacturer to pass off inferior cheese of this type as " whole milk " cheese. The prices realised by the various grades vary with the butter-fat content.*

A feature of the New Zealand cheese industry is the manufacture of " standardised milk " cheese and " modified milk " cheese. The system of payment for milk on a butter-fat basis in that country has had the effect of gradually raising the percentage of fat in the raw material, so much so that the fat-content of the cheese made from such milk is higher than the market requires. Accordingly, by recent regulations under the Dairy Industry Act, the standardisation of the fat-content of the cheese by adjustment of the fat-content of the milk is permitted. The fat-content of the dry matter of the cheese may not be reduced, however, below a statutory minimum. The adjustment of the percentages of fat and casein in the milk by skimming is only carried out with full knowledge of its original composition. The ratio of casein to fat

* *See* Table VI. for prices of various grades of Gouda and Edam cheese.

aimed at in the cheese is 0·7 to 1, and to arrive at the proportion of the total milk which is to be skimmed in order to obtain this ratio, the raw material is tested for casein as well as for fat. Roughly, the removal of the cream from 5 per cent. of the total milk used reduces the fat in the moisture-free substance of the cheese by 1 per cent. To avoid any deleterious effect on flavour, it appears inadvisable ever to skim more than 15 per cent. of the milk.

(*b*) *Moisture-Content.* — The moisture-content of cheese is indicated to some extent by texture and body, but can only be accurately gauged by analysis. It is governed wholly by the technique of manufacture and varies principally as between varieties, though also, sometimes, within the variety. The variation may be very wide but it bears no relation to variation in the moisture-content of the milk. Generally, the shorter-keeping varieties have a higher moisture-content than those which are not intended for immediate consumption. There is thus a wider range of moisture-content in Cheshire cheese, of which there are three types—early ripening, medium-keeping and long-keeping—than in other varieties. The "green" cheese of the Stilton and Wensleydale varieties, again, which are sold for consumption when still fresh, have a higher percentage of moisture than those which have been kept for "blueing." A large percentage of moisture is needed in the partly-skimmed and skimmed-milk cheeses in order to produce a soft curd, despite the lack of butter-fat.

High moisture-content is not necessarily a fault; whether it is to be regarded as such depends on the variety and type of cheese. The production of cheese containing a higher percentage of water than is suitable for the variety or type, by leaving excessive whey in the cheese, results in loss of quality both through the whey running from the cheese and by the development of undesirable flavours through fermentation. The temptation to obtain an extra weight of cheese per gallon of milk by including too much whey—in effect to sell whey for cheese—is strong with the makers of early-ripening varieties which are intended for consumption before the excessive whey has time to give rise to undesirable flavours. The tendency is especially marked with the makers of Cheshire cheese in the early part of the season. If cheese made for early sale and containing a high percentage of moisture is kept too long, its quality rapidly deteriorates, high moisture-content being closely connected with poor keeping-quality. The low price per pound consequently paid by the buyer to cover himself against the risks of loss of weight and deterioration of quality often more than nullifies the advantage of the extra weight to the producer.

(vii) Effect of Raw Material.

The nature of the milk used for cheese making has an important effect on the quality of the finished product. Until recently, the

effect of the food of the cow on the flavour of the cheese was given undue importance. It is true that food taints, such as those of turnips and some kinds of weeds, may be imparted by the cow to the milk, but the heat to which the curd is subjected in cooking does much to minimise, if it does not altogether eliminate, their effect. It is also true that the quality of the cheese varies to some extent according to whether the cows are grass or stall-fed; cheese made from milk produced under stall-feeding conditions is referred to in the trade as "fodder cheese," as distinct from the superior product "grass cheese." In some quarters, again, it is still strongly believed that the type of herbage eaten by the cattle has an important influence on cheese flavour and that the characteristic flavour of varieties is largely determined by the pastures in the particular locality where the variety is made. While it has been frequently demonstrated that local conditions have less influence on flavour than was once supposed, it is nevertheless true that the physical condition of the curd is affected by the nature of the soil of the district of production, and due allowance has to be made for this in the technique of manufacture.

A more important factor, however, in determining the quality of cheese is the bacterial condition of the milk. Bacterial action is an essential part of the making and the maturing of cheese, but some kinds of bacterial life interfere with both these processes. Most of these bacteria are introduced by unclean methods of milk production, although some may gain access to the milk through disease in the mammary glands of the cow. The most troublesome organisms are those of the *coli* group, which enter the milk through faecal contamination at some stage in its production. Gas formation in the curd—"blowing"—and objectionable flavour in the mature cheese are set up by the activity of these organisms. The proper care of milk during production is, therefore, of primary importance to the cheese-maker.

Apart from the influence of detrimental organisms, those organisms which are essential to cheese making need careful control in order to prevent them from having any harmful effect on the ultimate quality of the cheese.

The acidity required at coagulation and at later stages in the manufacture of cheese is produced by the action of certain types of bacteria on the milk sugar; the rapidity of acid development is mainly dependent on the numbers of such bacteria present and on the temperature at which the milk is kept from the time it is drawn to the time cheese making begins. The cheese-maker can accelerate this acid development in the cheese vat by adding "starter" (see page 9), and by bringing the milk to the optimum temperature for bacterial growth, and he can check it by cooling; he has no simple means, however, of satisfactorily neutralising excessive acidity that has developed through inefficient methods of handling before the milk enters the dairy. Too rapid acid development

makes the manufacturing process much more difficult, and unless "overtaken" in the course of the making it adversely affects the general quality of the cheese. For this reason, all circumstances which affect the delivery into the dairy of milk in proper condition for cheese making call for careful control.

When the cheese is manufactured on the farm where the milk is produced, the farmer is likely to realise the necessity for care in the operations which take place before the milk enters the dairy. Either he or a member of his family is often responsible for all the operations from the milking of the cow to the completion of the cheese ripening. The consequences of slackness in maintaining cleanliness are therefore brought home to the farmer since he actually sees the effect they have on the quality of his cheese. The difficulty experienced by cheese factories in obtaining milk in suitable bacterial condition for cheese making has already been discussed (Chapter III.).

Apart from skimming, the farmer is able to influence less the richness of the milk than its bacterial condition. Heavy feeding of concentrates is sometimes adopted in the attempt to produce rich milk yielding a high output of cheese per gallon. Modern research, however, does not indicate that high fat-content can be obtained in this way. Breeding has a greater influence than feeding on the composition of milk. The selection for breeding of the highest butter-fat yielders is not, however, common on cheese-making farms in this country.

The fat-content of milk produced for cheese making varies according to the season, being lowest in the spring and early summer and highest in the late summer and early autumn. This is due to the association of a high yield of milk per cow with a low fat-content. Early in the season, under the spring calving system usually adopted on cheese-making farms, the cows, being stimulated by the fresh grass, are at their period of maximum yield. The fat-content of the milk is, therefore, comparatively low. On the other hand, in the autumn, the lactation is nearing its end and the grass is becoming less plentiful and less nutritious. The yield of milk per cow is consequently lower and its butter-fat content higher. The late summer-made cheese tends, in consequence, to be richer. It is also asserted that the composition of the milk at this season produces finer flavour and better keeping-quality in the cheese, with the result that September-made cheese are regarded in the trade as the choicest.

(viii) Importance of Technical Instruction.

In view of the ability of the producer, by his control over the production process, largely to control the quality of the finished article, it is obviously desirable that the best methods of production should be widely known and practised by cheese-makers.

Towards the end of last century, the improvement which took place in the quality of imported dairy produce and the poor quality of much of the home produce emphasised the need for the dissemination of technical knowledge. In 1886, a number of farmers and others interested in agriculture in Cheshire set up a private institution on a farm at Worleston, near Crewe, to enable instruction to be given in Cheshire cheese making. The work was taken over by the County Council in 1891. Some indication of the importance attached, at that period, to technical instruction in dairying is afforded by the fact that out of the total grant of £2,610 made by the Board of Agriculture in 1889 for agricultural education in this country, £2,055 was allocated to instruction in the manufacture of dairy produce. There was at first considerable prejudice among producers against organised dairy instruction; the British Dairy Institute, for example, experienced difficulty in its early days in obtaining any students. The newly formed County Councils, however, pushed the work on with vigour and many of them appointed their own dairy instructors or instructresses. Institutions for centralised instruction increased in number, some offering facilities not only for instruction to cheese-makers and factory managers but for higher training as dairy teachers. At the present time, there are wide facilities at agricultural colleges and farm institutes for obtaining instruction in the best technical methods of cheese making and in allied sciences. In addition, instruction is given on farms to meet the needs of those who are unable to attend a course at an institution. Prejudice against organised instruction has not entirely been overcome. By the less skilled its acceptance is regarded as an admission of inefficiency; the resulting unwillingness to use the available facilities reacts upon the quality of the their output and handicaps marketing generally.

(ix) Need for Uniformity.

In order to compete effectively with imports, it is of the greatest importance that the cheese manufactured in this country should maintain a high and uniform standard of quality. So many circumstances affect the quality of cheese, however, and so large is the number of farm cheese-making units in this country—each working under different conditions as regards size of unit, breed and management of dairy herd, manufacturing accommodation, technical skill and financial standing—that it is not surprising to find a wide range of quality in the cheese of each variety. From a marketing standpoint, this is a disadvantage. Any esteem in which English farm-made cheese may be held, by reason of the high standard of quality attained by a proportion, is seriously discounted by the lack of uniformity of the whole. It is true that greater uniformity of product can be obtained by the factory system of cheese making than by manufacture on a large number of individual farms, bnt the factory product tends to be of poorer average quality, though

this does not apply with equal force to the product of the single-purpose cheese factory. Although in theory, given proper supervision of the quality of the milk, the factories should be able to turn out cheese of as high quality as the best farm-made cheese, difficulties arise in practice which prevent them from doing so. Home-produced factory cheese, indeed, has no advantage in respect of quality over the best imported cheese—which is also factory-made.

Wider knowledge of the factors influencing quality and the application of scientific principles to the manufacturing process greatly modify the adverse influence of the varying conditions under which farm cheese making is carried out, but some method of establishing an ideal standard of quality for each variety, at which producers might aim, is in any case desirable. At present, there exists a fairly general consensus of opinion among cheese experts as to what constitutes high quality in any variety; it should, therefore, be a fairly simple matter to establish a standard on fairly broad lines, even though the standard might not be definable in words. In present circumstances, the buyer's judgment of quality is not in all cases sufficient to stimulate the cheese-maker to adjust his technique so as to produce an article which accords with trade requirements. The maker is too apt to rely on his own judgment of what constitutes a good cheese. Even technical instructors are not always guided in the methods they advocate by the need for producing an article which is of high quality as judged by the buyer's criterion. If, however, official sanction were given to a quality standard based on a recognised degree of excellence, that standard would have a strong influence in stimulating the production of cheese of higher and more uniform quality than is at present produced; it would directly influence the cheese-maker himself and it would also form a uniform basis on which technical instructors might work. With the aid of a marking system, it would also be of service to the retailer in buying his supplies.

CHAPTER VIII.—GRADING (I).—ACCORDING TO COMPOSITION.

(i) General.

Agricultural products being by nature variable, it is desirable that they should be graded in order to facilitate their distribution to the consuming public. "Grading as a marketing activity consists of classifying or sorting a commodity into groups, no two of which overlap, and in each of which the commodity is of a practically uniform kind, size, or quality; but a certain range and tolerance are allowed in each grade. Such grading, to be of maximum value, is accomplished through the use of recognised standards. Standardisation establishes the permanency of the grades and does not

allow them to change with the market or from year to year. Without such established and uniform standards we have no good basis for buying or selling, no common language for both buyer and seller, and no standard of quality upon which values may be fixed."*

Grading to recognised standards simplifies the task of buying for the wholesaler, the retailer and the consumer. It is essential to the creation of confidence, on the part of the buyer, in the output of any producer, association or country. It promotes the use of brands and marks which serve as a guarantee of quality and constitute the basis of advertising and propaganda. It facilitates comparison between lot and lot and between market and market and thus makes for stability of prices. It provides an objective for the producer and, by securing for the high-quality article its proper differential price, stimulates better production.

Only a broad classification is practicable, however, under any cheese-grading system, since it is not possible to take account of the fine differences between the quality requirements of individual distributors—determined as these requirements are, in the ultimate analysis, by local variations in consumer-demand. For this reason, and because of the change which normally goes on in cheese during ripening, some further selection is necessary even where grading is done. This ultimate selection, which in effect is a refinement of grading, is carried out in practice by the cheese factor or wholesaler, who knows the precise requirements of his retail customers.

(ii) Classification by Moisture-Content.

As already explained, several characteristics contribute to quality in cheese ; there are those, such as moisture and butter-fat content, which relate to composition and can be accurately determined by analysis, and there are others, such as flavour and texture, which do not lend themselves to exact measurement. There are thus two methods of classifying cheese of any particular variety—on the basis of the measurable and immeasurable characteristics respectively. The food value of cheese is, in part, affected by its moisture-content ; moreover, the well recognised types of cheese, e.g., hard cheese, soft cheese, are broadly distinguishable by the proportion of moisture which they contain (see pages 10 and 11). Certain countries have, therefore, introduced systems of compulsory classification of cheese on the basis of moisture-content (see Appendix A), under which a maximum percentage of moisture is fixed for various types of cheese. Such systems of classification by moisture-content are usually combined with the control of butter-fat content.

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* Taylor. " Outlines of Agricultural Economics," page 417. Macmillans, London and New York.

(iii) Classification by Butter-fat Content.

Of the measurable characteristics, the greatest importance is attached to butter-fat content. Cheese deficient in butter-fat is definitely lacking in quality. It is not, however, essentially a matter of food value. Cheese deficient in butter-fat contains a correspondingly higher proportion of casein, the food value of which, like that of fat, is high. Its inferiority of quality lies in its comparative unpalatability. The sale of cheese deficient in fat, unless identifiable and sold as such, not only constitutes a form of unfair competition with the full-cream product but also tends to bring into general disrepute, in an international market such as that of the United Kingdom, the produce of any country where butter-fat content is not subject to control.

Broadly, therefore, the objects of classifying cheese on the basis of fat-content are (i) to protect the consumer from the sale of cheese of low butter-fat content for that of higher quality; (ii) to protect the makers of full-cream cheese from the competition of the inferior product and (iii) to safeguard national reputations.

The butter-fat percentage in the moisture-free substance of cheese is chiefly determined by the ratio of butter-fat to casein in the original milk. Normally, the casein-content of milk increases with the butter-fat content but not necessarily in the same ratio; indeed, it may actually decrease. The mixing of the milk of a number of cows, however, as well as the mixing of night's and morning's milk, tends to even out any abnormalities, and it is, therefore, possible to fix a minimum proportion of butter-fat in the moisture-free substance of cheese and to assume, with justice in practically all cases, that cheese containing less than this minimum has been made from milk from which part of the cream has been removed.

Accordingly, many countries have introduced systems of classification and marking, either compulsory or voluntary, on the basis of the percentage of butter-fat in the moisture-free substance of cheese. In some countries, butter-fat control is a part—and only a part—of a wider system of quality control which takes into account the imponderable elements that go to make up commercial quality in cheese (see Chapter IX).

Appendix A on page 152 gives some examples of compulsory systems of classification based on butter-fat which are in operation in various countries. The most common standard for cheese made from whole milk is that of a minimum of 45 per cent. butter-fat in the dry matter. The figure in use in each country has been arrived at by the analysis of many samples of cheese known to be made of whole milk. In some countries, it is forbidden to sell cheese without some indication that it is made from skimmed or partly skimmed milk—i.e., as whole-milk cheese—unless it contains a definite minimum percentage of fat in the moisture-free substance. In

other countries, the export of cheese containing less than a statutory minimum of butter-fat in the dry matter is prohibited ; thus, cheese containing less than 50 per cent. butter-fat in the dry matter may not be exported from New Zealand. The cheese industry in the Netherlands has a system of grading and marking cheese on a butter-fat basis which is worth detailed description.

(iv) The Dutch System.

In the Netherlands, the marking of all cheese, sold or exported, with a mark indicating its butter-fat content is compulsory. In practice, this marking is carried out by a voluntary system of control, administered by the producers themselves under State supervision.

Cheese control in the Netherlands was initiated early in the present century by various private interests for the purpose of preventing, so far as possible, the substitution of skimmed-milk for whole-milk cheese. In its early years, the scheme was free from State control or supervision and was limited solely to whole-milk cheese.

The work was carried out through what are known as Cheese Control Stations, the first of which was established in 1906 at The Hague and was operative for farmers making whole-milk cheese in the province of South Holland. The utility of the work came to be generally appreciated and, at the request of the various interests concerned, the policy of control was officially recognised by the State to the extent that, in 1911, an Act was passed which, while still retaining the original voluntary system of control, gave the scheme a national importance by placing it under the supervision of the State. Since then, the number of Cheese Control Stations has been increased to four, one in each of the principal cheese-making districts ; at the same time, control has been extended to skimmed-milk, as well as whole-milk, cheese.

Further, a law has been passed under which each individual cheese exported must bear a control mark, applied during manufacture, indicating the fat-content of the moisture-free substance of the cheese. The marking of Dutch cheese for sale within the country with an indication of its fat-content has also recently been made compulsory.

Supervision is exercised by the State in two directions ; the State issues regulations protecting the authorised marks and it also exercises supervision over the use of the marks in addition to the main control carried out by the Control Stations themselves. The principal condition regulating the use of the authorised marks, which are four in number (Fig. 13), is that they may be issued only to the Boards of the Control Stations, who redistribute them to their members in accordance with specified conditions. The Control Stations themselves are supervised by, and open to the

inspection of, the State. The principal conditions imposed upon the Control Stations are that they may admit only reputable persons as members and that they must give a guarantee that their members make cheese only from cows' milk, without the addition of other fats, that the fat-content of all marked cheese is not less than that indicated on the mark and that its moisture-content is within normal limits. Independently of the control exercised by the Stations, the State further checks the quality of cheese bearing the mark by inspecting and sampling marked cheese on farms, in factories and warehouses, and at ports, etc. Samples taken under these conditions are analysed and tested at the State Dairy Station, Leiden, but only in cases where they are found deficient is further action taken and communication made with the Control Station concerned.

The main work of control devolves upon the Control Stations, which are situated at The Hague, Utrecht, Alkmaar and Leeuwarden. The first two deal mainly with farmhouse cheese and are, therefore, largely concerned with the whole-milk product; the last has a membership composed of factories only and is, therefore, concerned chiefly with cheese containing less than its natural proportion of fat, while the station at Alkmaar includes in its membership both farms and factories and, therefore, deals with both types of cheese. In all cases, membership is voluntary.

Each Control Station is an independent self-supporting unit, operating on a co-operative basis and maintained by annual subscriptions from members and by the revenue obtained from fines and from the sale of the marks, any surplus accruing, after maintaining a reserve, being returned to the members each year. The Stations do not trade in cheese. The management of each Control Station is in the hands of a Board appointed by the founders or promoters of the Station and by its members.

Control Stations issue to their members marks for whole-milk and skimmed-milk cheeses. These are serially numbered, thus enabling the identity of the maker of any marked cheese to be established. Since the maker (farmer or factory) is responsible for fixing the marks to the cheese, the conditions of membership are highly important. They include the following :—

> Members may not be connected with the trade in margarine or other fats or oils capable of being used for the adulteration of cheese.
>
> Besides milk, no substances except colouring matter, rennet, salt, saltpetre and spices may be included in the cheese.
>
> Control marks must be placed on all cheese made by members, who must take no part in trading cheese which does not bear a control mark.
>
> Records must be kept by members showing the serial numbers of marks received and used, the quantities of milk (morning and evening separately) used for cheese making, the quantity of whey-butter made, the number and weight of each consignment of cheese sold and the names and addresses of consignees. Cheese factories must also

record the fat-percentage of every vat of milk from which cheese is made and the serial numbers of the marks applied to all cheese made from each vat, while a sample of milk out of each vat must be kept for a period of 48 hours on behalf of the Control Station. Except under special circumstances, farm cheese must be made twice daily and no milk from one milking may be held over till the next. Separators are not allowed on the farms.

The outdoor staff of the Control Station periodically visit the members' premises, check the record books and take a number of samples, which are tested and analysed in the Station laboratory. Each member is visited, on the average, once a fortnight ; samples are taken from two or three cheese in the case of farms, and one sample for every ten vats of cheese in the case of factories, by cutting a thin layer off the surface of the cheese but not sufficient to cause disfiguration or damage. If the sample is found on analysis to be below standard, a second is taken by " boring " the same cheese. If this is again unfavourable, the mark is removed from that particular cheese and three further samples are obtained, one from the defective cheese, one from an older cheese and one from a newer cheese. Should two out of three of these fail to comply with the standard, the marks are removed from all cheese and the complete stock of marks is withdrawn from the member. There are also various monetary penalties for misuse of the marks. These, however, are of relatively minor importance ; the heaviest penalty is the withdrawal of the right to use the mark, since cheese not bearing the Control mark realises less per lb. than that bearing the mark, through being excluded from the export trade.

The four cheese marks are for use on cheese with a minimum proportion of fat in the moisture-free substance of 46*, 40, 30 and 20 per cent., respectively. The marks are casein discs (Fig. 13) manufactured at a special factory at Leiden, the joint property of the Control Stations, producing about 40 million marks annually.

The mark for the full-cream cheese (" Volvet ") is slightly larger than the other three marks and is of distinctive design ; its lettering is in blue as compared with black for the 20+, 30+ and 40+ marks. Besides the design and the figures indicating the fat percentage, each mark bears the identifying letter of the Control Station issuing it and, as already stated, a serial number which, *inter alia*, serves to identify the producer.

The responsibility for fixing the marks to the cheese devolves on the makers, but the Control Stations keep records of all marks issued and the farmers and factories must record the numbers of the marks used each day. The marks, after being steeped in hot water until they have become flexible, are placed in the mould with the curd and are permanently pressed into the substance of the cheese. Being made of casein, they ultimately become an integral part of the rind, from which they cannot normally be removed without cutting.

* The minimum percentage of fat permitted in the " Volvet " cheese was until recently 45, and the Control marks still bear this figure.

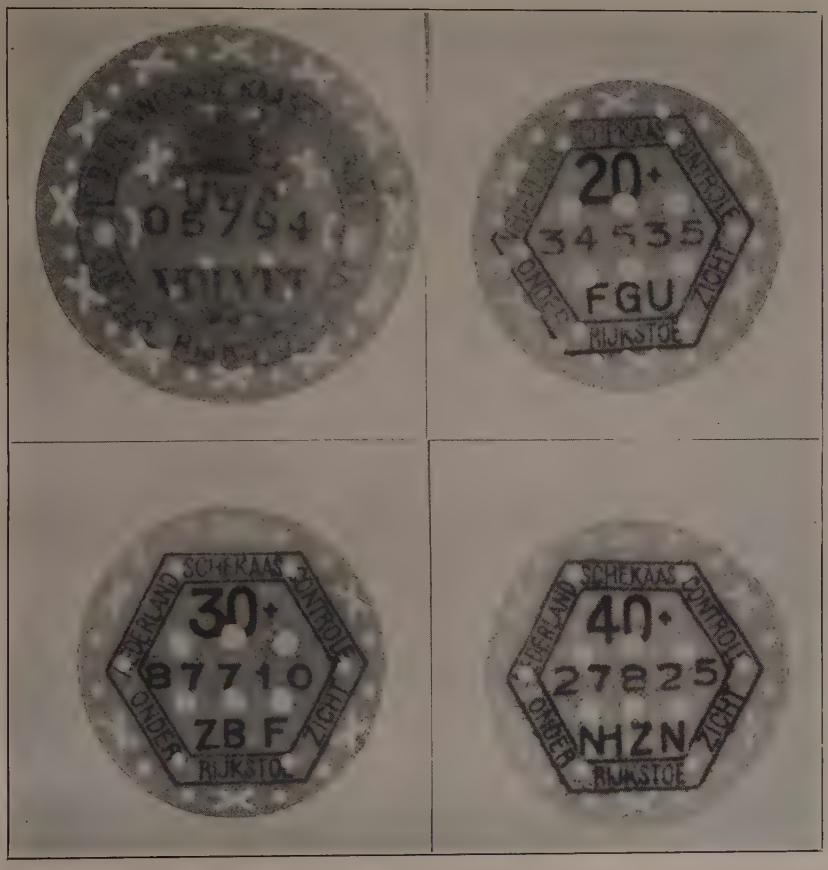

Fig. 13.—The Netherlands Cheese Control marks.

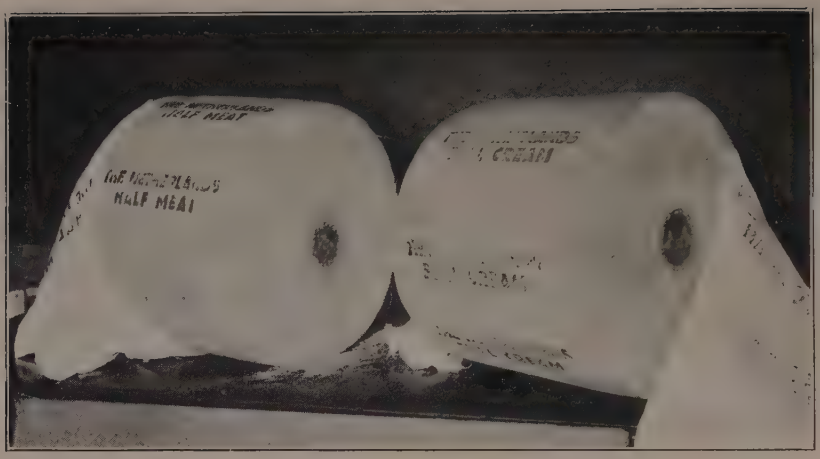

FIG. 14.—Netherlands cheese of Cheshire type, showing bandage removed and description on rind.

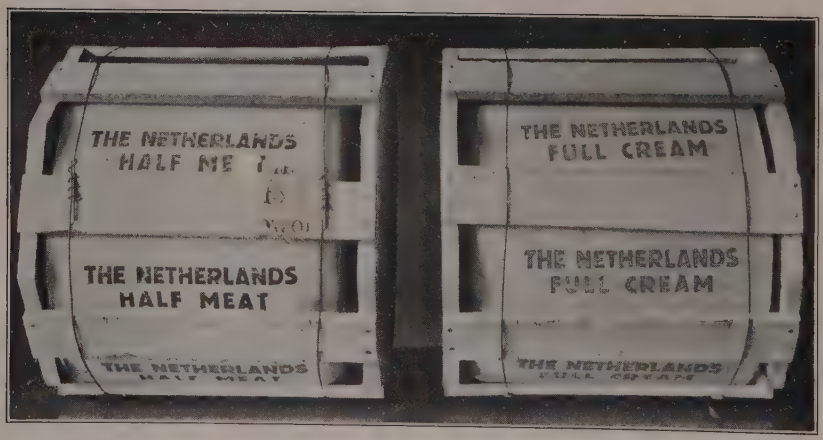

FIG. 15.—Netherlands cheese of Cheshire type in single crates, showing description on the bandage.

A recent requirement is that all Dutch cheese of English varieties shall also be conspicuously marked as "full cream" or "half-meat" as the case may be, by means of an inked rubber stamp (Figs. 14 and 15) (See also page 91).

(v) Butter-fat Standards for Great Britain.

In 1923, the Linlithgow Committee made a recommendation in favour of defining a minimum standard of butter-fat to which all whole-milk cheese offered for sale in this country should be required to conform.* The problem was subsequently placed before the Milk Advisory Committee set up by the Minister of Agriculture and the Minister of Health; this Committee reported against the fixing of such a standard. Since then, the subject has been brought forward on numerous occasions by various representative bodies. As an instance of the kind of proposals which have frequently been put forward, a Private Member's Bill was introduced during the 1929–30 Session of Parliament which seeks to lay down, as a presumptive standard for whole-milk cheese, a minimum of 45 per cent. butter-fat in the dry matter of cheese, and to require the marking of the package or wrapper in which skimmed-milk cheese is sold and the labelling of such cheese, when displayed for sale by retail, with the words "skimmed-milk cheese."

The arguments for and against such a measure in this country may be based on (a) its necessity and (b) the practicability of administering it without inflicting hardship on both producers and distributors.

If it is desirable that the consumer should be afforded some protection in this matter, it would seem that existing legislation is hardly adequate for the purpose. There appears to be no offence against the Food and Drugs (Adulteration) Act, 1928, if a purchaser who asks merely for "cheese" is supplied with cheese made from partly skimmed milk†: in common parlance, the term "cheese" does not appear to carry the implication of whole-milk cheese. It has been held by a number of Benches, however, that an offence has been committed under this Act when a purchaser asking for "Cheshire cheese," or any other variety generally recognised as a whole-milk cheese, is supplied with cheese made from skimmed milk.

The necessity for protecting the consumer from the sale of skimmed-milk cheese as whole-milk cheese, on the ground that the solids of skimmed-milk cheese are relatively deficient in food value, remains to be established. It is a matter of the relative proportion of two food constituents—fat and protein—rather than of actual food value. As previously indicated, it is in palat-

* Cmd. 1854/1923, p. 76.

† Under this Act, cheese is defined as "the substance usually known as cheese, containing no fat derived otherwise than from milk."

ability rather than nutritive value that skimmed-milk cheese falls short of whole-milk cheese, so that the question of a legal standard for cheese is in a different category from that of a standard for milk. In the retail trade, it is customary to give the buyer the opportunity of tasting the cheese before purchasing, and although a small deficiency in fat cannot be detected by tasting, a deficiency of, say, 15 per cent. can be so detected. Cheese of low fat-content usually sells at a lower price for this reason. It is true, however, that deceptive methods of display are frequently adopted by retailers in the attempt to pass off skimmed-milk as whole-milk cheese.

The protection of the home producer of whole-milk cheese from the competition of cheese, both home-produced and imported, which is deficient in fat is a matter of some importance. Such cheese, as has been pointed out, sells at a lower price, and so long as it is sold under the unqualified term " cheese," it directly competes with the whole-milk product, even though the inferiority of quality may be discernible by tasting. The impression apt to be created in the consumer's mind under present conditions is that the skimmed-milk cheese is merely a cheap type of ordinary cheese. The compulsory sale of the fat-deficient cheese under the designation " skimmed-milk cheese " would definitely inform the buyer that it is a distinct and inferior article. Its competition would then be less direct ; it would, in fact, be competition similar to that of margarine with butter, rather than that between inferior and high quality butter.

Incidentally, a certain amount of " half-meat " cheese is produced by factories in this country, and, from the standpoint of safeguarding the reputation of the home-produced whole-milk product, some means of differentiating the former from the latter is no doubt desirable.

On the question of equity, the enforcement of a 45 per cent. standard of fat might cause occasional hardship to individual cheese producers, since, in a very small proportion of cases, cheese made from whole milk may not contain 45 per cent. of fat. The figures given on the opposite page, which were collected in the Netherlands, illustrate the proportion of cases of this kind likely to occur in that country. It is unlikely that, if similar statistics in relation to whole-milk cheese produced in England and Wales were obtained, they would reveal a higher proportion.

Monthly Analysis, in 1927, *recorded by the South Holland Cheese Control Station, of Samples of Full-Cream Gouda Cheese.*

Fat-content of Moisture-free Substance.	Number of Samples.													
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Percentage of Total.
Per cent.														
51 and under 60 ...	491	309	847	2,077	619	720	1,024	1,396	1,303	2,293	2,229	948	14,256	21·95
48 „ „ 51 ...	980	1,025	2,467	3,043	4,857	4,946	4,936	4,891	4,236	3,567	2,223	1,546	38,717	59·61
45 „ „ 48 ...	245	335	903	664	2,183	1,849	1,814	1,127	1,174	689	377	286	11,646	17·93
Under 45	15	24	21	18	44	59	50	25	29	13	16	15	329	0·51
Total ...	1,731	1,693	4,238	5,802	7,703	7,574	7,824	7,439	6,742	6,562	4,845	2,795	64,948	100·00

A more important point, however, is the allocation of responsibility between the producer and the distributor. The distributor has no practicable means of checking the fat-content of cheese bought by him. He would have to rely on the good faith of the maker to supply him with whole-milk cheese, and save him from the risk of a criminal charge. Hence, the establishment of a minimum fat standard for whole-milk cheese would make it necessary for the distributor either to require a warranty from the producer that the cheese bought was whole-milk cheese, or, as this may not go far enough, to require that each maker's responsibility be attached to his product by means of an identification mark and a description guaranteeing that the cheese is made from whole milk, this being done in some organised and comprehensive fashion such as that adopted by producers in the Netherlands (see also Chapter IX, page 83).

It should be added that the sale of skimmed-milk cheese in this country does not appear to be large. Most of the imported skimmed-milk cheese is Dutch and the imports of Dutch cheese of all kinds amount to only about 6 per cent. of the total imports into this country. Moreover, in addition to bearing the disc-marks of the Dutch Cheese Control, all Dutch cheese of English varieties is now boldly marked on the rind with ink stamps to indicate fat-content. It is important, however, to note that practically all the Dutch "half-meat" cheese is sold in one district—the North of England—and at one season—the winter.

CHAPTER IX.—GRADING (II)—FOR QUALITY AS A WHOLE.

(i) General.

The grading of cheese, in its widest sense, takes into account not only composition, but also such features as flavour, body, texture, colour and appearance. Whereas composition can be accurately measured by analysis, the assessment of the other quality features must ultimately depend on personal appraisal, which, however, is usually systematised by what is known as the scoring method. This method consists of allotting to each quality feature—flavour, texture, body, etc.—a maximum number of possible points according to the relative importance of each feature in its contribution to general quality. The total number of points amounts to 100. In judging any individual sample, points are deducted from the maximum allotted to each quality feature, according to the judge's estimation of how far the product departs from the ideal. World opinion is unanimous as to the relative importance of the various features for the purpose of scoring, although the actual score value of each feature may be

subject to slight variation as between one scoring system and another. The following are examples of the different scales of points in use :—

Feature of Quality.	English Cheddar Cheese-makers' Federation.	Cheshire Cheese Federation.	Ayrshire Agricultural Association.	Government Grading Standards.				
				New Zealand	Canada	South Africa	Australia.	U.S.A.
Flavour ..	50	40	40	50	45	50	50	45
Texture ..	30	20	40	30	25	30	30	15
Body ..		20			15			15
Keeping-Quality								
Colour ..	10	10	12	15	10	10	20	15
Finish ..	10	10	8	5	5	5		10
Salting ..						5		
Total ..	100	100	100	100	100	100	100	100

This method of judging quality in cheese is an attempt to interpret individual sense-impressions in as precise a manner as possible. It is obviously not so precise a method as analysis, since judges may differ both in their conception of the perfect cheese and in their evaluation of individual samples. Provided the judge or grader is competent and experienced, however, it represents the best means of grading according to commercial value that has been devised. It is doubtful how far, in practice, the judging of the cheese is actually based on the scale of points which is theoretically followed. The experienced judge may appraise the general quality of the cheese almost instinctively without making separate awards for each quality factor.

(ii) The Practice Abroad.

In the international cheese trade, competition demands ever-increasing attention to quality. For this reason, the majority of exporting countries have introduced systems of grading cheese intended for export. Importing countries, on the other hand, have not always fully appreciated the necessity for grading their produce. The incentive to grade is greater in the export trade. The advantage to the buyer of being able to purchase large consignments on description, with some certainty that the goods when delivered will fulfil expectations, is so great in long-range trading that graded goods are likely to demand a readier market than ungraded. Moreover, the process of grading cheese is facilitated in the export trade by the relatively large size of individual consignments and the small number of exits through which the cheese leaves its country of origin. In the home trade, on the other hand, the transactions are more numerous and smaller. The possibility

of direct trade between producer and retailer is greater. The trade, therefore, is less organised. Moreover, the assembly channels do not naturally converge towards a small number of points. These conditions hinder the development of an organised system of grading. The absence of such a system not only increases the labour and expense of marketing the home product but puts it at a disadvantage from the point of view of demand in competing with imports of graded produce. It is believed that the introduction of a grading scheme for home-produced cheese would do much to help it to attain greater importance on the home market.

Some consideration of the systems of grading cheese for export adopted in New Zealand, Canada, Australia, and other countries will be of interest.

(*a*) *New Zealand.*—The necessity for grading dairy produce was realised in New Zealand as far back as 1894, when the Dairy Industry Act was introduced, making provision for the compulsory grading of butter and cheese before export. This and subsequent legislation were consolidated in the Dairy Industry Act of 1908 which, with a few later amending Acts, remains the principal enactment controlling the grading of cheese. By regulations under this Act, cheese, besides containing at least 50 per cent. of fat in the dry matter, must be graded by an official grader and must reach a certain minimum standard before export is allowed.

Steps are also taken, under the Dairy Industry Act, to ensure high quality by providing that no inferior curd or cheese shall be incorporated in any cheese during its manufacture, that all Cheddar cheese must be kept on shelves for at least 14 days before packing for sale or export, during which time each cheese must be turned

FIG. 16

once a day, and by providing for the standardisation of the shape and size of any kind of modified-milk cheese. It is further provided that, within 24 hours of its first removal from the cheese hoop, each cheese must be clearly and indelibly branded with the manufacturer's registered brand, the vat number of the cheese and the

day of the month on which it was manufactured, and that every package of cheese must also be branded with the manufacturer's registered brand. (Fig. 16.)

These conditions apply to all cheese whether intended for export or not; every package of cheese submitted for grading must, in addition, bear in letters and figures of specified type the words "white" or "coloured," the consecutive number of the package, the vat number of the cheese, and the day of the month on which the cheese was manufactured. Finally, cheese for export must be contained in standard crates which bear, in clear and indelible figures, the true net weight of the contents at the time of grading (Fig. 29). In the case of dairy cheese or modified-milk cheese, all branding and marking (except shipping marks) must be in red, and, in the case of factory cheese, in some dark colour other than red.

The process of grading may only be carried out at certain specified grading stores, 17 of which have been enumerated in the regulations; cheese for export to Australia and the South Sea Islands must be forwarded to one of the appointed stores at least 24 hours before shipment; for export to all other countries it must be forwarded at least four clear days before shipment. At the same time, the owner must notify the grader at the port of shipment, giving full particulars of the number of packages, the brands, contents, weights and so on. The forwarding of cheese to a grading store does not relieve the owner of his responsibility for the cheese; he must still make his own arrangements for storage, for transit to and from the store, for shipment, and, if desired, for insurance against loss or damage.

The actual grading is carried out by examining at least one cheese—or more if necessary—from each vat. The scoring method is in use, the maximum number of points allotted for the various quality factors being shown on page 71. For modified-milk cheese and dairy cheese, however, the use of the scoring system by graders is optional.

There are four grades for full-cream and standardised-milk factory cheese and three grades for other kinds. The grade requirements are as follows:—

Grade.	*Full-Cream and Standardised-Milk Cheese.* (Points.)	*Modified-Milk and Dairy Cheese.* (Points.)
Finest	93 and over ...	No grade.
First Grade	90 and under 93 ...	90 and over.
Second Grade	80 and under 90 ...	80 and under 90.
Third Grade	Under 80	Under 80.

As soon as possible after grading, each package is stamped with its appropriate grade mark (Fig. 17) as defined by regulation, and simultaneously the grader forwards to the owner or

the cheese a certificate of grading. The grader's decision as to the grade to which any particular cheese is allotted is final, but under certain circumstances re-grading may be undertaken and the original grade altered if necessary. For the service of grading, a fee is

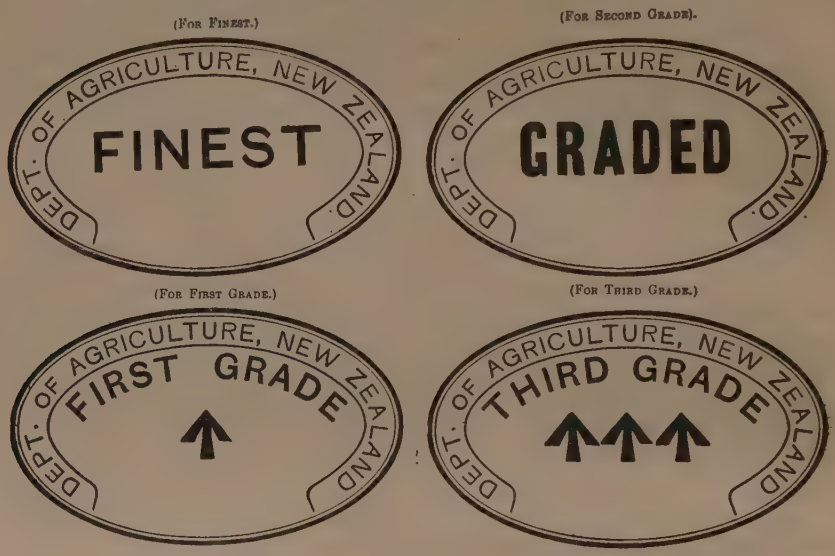

Fig. 17

charged by the State of 1·65 pence per standard crate of full-cream cheese and 2·65 pence per standard crate of standardised-milk or modified-milk cheese.

(*b*) *Canada.*—State supervision of the dairy industry in Canada began with the Dairy Industry Act, 1914. The principal provision of this Act and its later amendments, so far as they are relevant to the subject matter of this Chapter, prohibit (i) the manufacture, importation and sale of any cheese containing any fat or oil other than that of milk or cream ; (ii) the incorporation in a new cheese, during manufacture, of any inferior curd or cheese ; and (iii) the placing in a cheese, during or after its manufacture, of any foreign substance. Regulations under this Act further provide for the compulsory labelling of skimmed-milk cheese and of the package containing it.

The provisions of the 1914 Act regulating the quality of cheese are thus mainly negative. Positive measures were left to be developed voluntarily by various federal, provincial and trade interests. For example, " During the seasons of 1920 and 1921, a Dominion official was stationed at Montreal to grade cheese for sale at auction by the United Dairymen's Co-operative, an Ontario organisation. The work was continued in 1922 and was extended to a number of

exporting firms who wished to take advantage of the service."* The results of voluntary efforts were considerable, but the need was felt for some central co-ordination, and, with this end in view, the Dairy Produce Act of 1921 was passed. The chief provision of this Act is the compulsory official grading of dairy produce intended for export. The Act came into operation on 1st February, 1926. Compulsory grading under this Act commenced in 1923, the existing regulations governing the grading of cheese being promulgated in April, 1927.

In addition to the requirements of the Dairy Industry Act, 1914, cheese submitted for grading must conform to the following regulations :—

(i) Every cheese and every package containing cheese must be marked at the factory with the vat number ; the vat numbers to run consecutively throughout the calendar year, commencing with number 100. For any irregularity in this respect necessitating the examination of each package separately, a fee of 25 cents for each box of cheese may be imposed, and no grader's certificate will be issued until the fees are paid.

(ii) Each package must bear the registered number of its factory of origin.

(iii) Cheese must be sufficiently mature to permit of the quality being properly determined.

If these conditions are satisfied, the official grader grades one cheese from each vat in every consignment on the basis of the scale of points shown on page 71. In all, there are four grades ; the grade designations and requirements are as follows :—

Grade.	*Total Score.* (Points.)	*Minimum Score for Flavour.* (Points.)
Special Grade	94 and over ...	41.
First Grade	92 and under 94 ...	39.
Second Grade	87 and under 92 ...	37.
Third Grade	Under 87	Under 37.

A fifth category is provided for cheese known as " No Grade " cheese. The border line between Third Grade and No Grade cheese is somewhat vague. No minimum score is provided for Third Grade. The question whether cheese falls into Third Grade or is classed as No Grade is dependent, in theory, on the existence of certain faults of flavour, texture and so on defined by regulation. The various grade marks are shown in Figure 18.

No cheese may be exported from Canada unless it contains at least 45 per cent. of fat in the dry matter.

The Canadian system differs from that in use in New Zealand in that a minimum score for flavour is required as well as a minimum

* Canada. Department of Agriculture. Bulletin No. 67.

total score for each grade. No minimum score per grade is laid down for the other quality factors—texture, closeness (or body),

FIG. 18

colour and finish (or appearance)—separately, but certain instructions are given as to the standards which the cheese should attain in respect thereof.

(*c*) *Australia.*—In Australia, grading is officially controlled as in New Zealand and Canada, and, but for differences in detail, the system in practice is the same. The Commerce (Export Dairy Produce) Regulations of 1926 and other proclamations under the Customs Act (1901–1923) and the Commerce (Trade Descriptions) Act, 1905, control the procedure.

No cheese may be exported from Australia unless it has first been graded by an officer of the Customs. Preliminary to grading, the following conditions must be fulfilled :—

(i) Cheese must be packed in crates of specified manufacture and dimensions.

(ii) All cheese before export must bear a trade description in the form of a principal label or brand specifying the net weight or quantity and containing a true description of the goods and the word "Australia," the name or brand of the manufacturer, producer or exporter, the date of manufacture, the number of the crate, the number of the vat and the letter "C" or "W" to denote whether the cheese is coloured or white.

(iii) Cheese intended for export must be submitted for examination at least 3 clear working days before shipment, and an advice note must be sent by the manufacturer or owner to the Commonwealth Dairy Branch in the particular State concerned; intention to export cheese also requires written notice to be given to the Customs at least one clear working day before the proposed date of shipment.

(iv) No cheese under 3 weeks old may be submitted for grading except with the approval of a duly authorised officer.

In grading, the scoring method is used; the scale of points employed is given on page 71.

The four grades in use are as follows :—

Grade.	*Score.* (Points.)
Choicest...	92 to 100 inclusive.
First Grade	90 or 91.
Second Grade	86 to 89 inclusive.
Third Grade	82 to 85 inclusive.

No grade designation is applied to cheese scoring less than 82 points and the export of such cheese is not allowed.

After grading, the official grade-marks are applied to the packages containing the cheese, which must then, within 12 hours, be placed in an appointed cool store at a temperature of between 33 deg. and 50 deg. F.

To cover the cost of the services rendered in connection with examination and grading, the exporter is charged the following fees :—

	Per Crate.
Cheese, per crate containing 166 lb. or less ...	1¼*d.*
Cheese, per crate containing more than 166 lb.	3*d.*
4 Cheese contained in 1 crate	2½*d.*
Cheese of varying dates in same crate ...	2½*d.*
Cheese, in tins, per package containing :—	
(*a*) 56 lb. net or under	1½*d.*
(*b*) Over 56 lb. net	3*d.*

No cheese may be exported from Australia unless it contains at least 50 per cent. of fat in the dry matter.

(*d*) *Other Countries.*—Italy, one of the most important cheese exporting countries, has no national system of quality control. Much of the cheese produced in that country is made by large firms of manufacturers who are careful to maintain their own standards. In the Netherlands, also, though the fat-content of the cheese is controlled, there is no control of general quality.

In South Africa, compulsory grading of all Cheddar and other hard-pressed cheese, except Gouda, has been provided for by the Dairy Industry Control Act, 1930 (see page 106). This applies to all cheese, whether for export or not, and, as the export of cheese from South Africa is relatively unimportant, is an interesting example of compulsory grading for the home trade.

(iii) Experience in England.

The adoption of cheese grading in the countries supplying the bulk of the imports into the United Kingdom has given their produce an advantage in competing with home supplies ; the cheese industry in this country, therefore, cannot afford to postpone taking similar action. It is true that in importing countries grading is more difficult to organise and the need for it is less obvious than in exporting countries. It is, however, none the less necessary, and its necessity is becoming increasingly realised. In Germany, for instance, which, like this country, is a large importer of cheese,

local schemes for grading cheese on a butter-fat basis have recently been initiated, either voluntarily by producers, or compulsorily by State regulations. Thus, in the Rhine Province, a system of voluntary control of cheese quality was established in 1923, while the Governments of Bavaria and Wurtemburg have recently laid down regulations for the classification of cheese into grades based on butter-fat content. As stated above, the recent South African dairy industry control legislation affords an instance of the initiation of cheese grading for domestic trade.

In this country, a start has been made in the same direction within the last four years, by the establishment of voluntary grading schemes for the two principal varieties of British cheese—Cheshire and Cheddar. In 1927, two federations of cheese makers—the Cheshire Cheese Federation and the English Cheddar Cheese Makers' Federation—were formed for the purpose of grading and marking these two varieties.

(*a*) *Cheshire Cheese Federation.*—The Cheshire Cheese Federation, membership of which is open to Cheshire cheese-makers in England and Wales, has established a trade-mark (Fig. 19),* the

FIG. 19

use of which is restricted to producers, either farmers or factories, registered by the Federation as "accredited makers." The main conditions of registration are :—

(i) the producer's cheese, on examination by the Federation's grader, must give evidence of a high standard of skill in cheese making on the part of the producer, and must, as indicated by analysis of a sample, contain a minimum of from 46–50 per cent. [*sic*] of butter-fat in the moisture-free substance :

(ii) the cleanliness of the producer's dairy, cow-sheds and yards and the condition of the drains on his premises must fulfil the requirements of the Milk and Dairies Order, 1926.

(iii) The payment of a registration fee, amounting, in the case of a farmer with 50 cows or less, to £1, in the case of a farmer with more than 50 cows to £2, in the case of a factory to £10, and, in addition, the

* The three intertwined C's composing the trade-mark stand for "Choice Cheshire Cheese."

payment of a levy of 6d. per cwt., in advance, on the estimated annual cheese output of the maker, reckoned on the basis of 4 cwt. of cheese per cow per annum.

The Federation supplies each accredited maker with a rubber stamp bearing the trade-mark and the maker's registered number. Cheese is graded at the maker's premises by the Federation's official grader (Fig. 21) according to the scale of points shown on page 71. All cheese must be stamped at the time of making with the date of manufacture and no cheese under 18 days old is graded. All cheese scoring 92 points or more is marked by the grader with a rubber stamp (Fig. 22), as qualifying for stamping by the maker with the trade-mark. No cheese that does not bear the grader's mark is eligible for trade-marking. The grader is required to examine and grade each individual cheese. The object of this rule, which adds considerably to the cost of grading, is to ensure absolute reliability in the cheese bearing the trade-mark. It is regarded by the Federation as essential to the establishment of a reputation for graded cheese.

In addition to its grading activities, the Cheshire Cheese Federation endeavours to influence the level of prices received for graded cheese by notifying its members weekly a price below which it is suggested that graded cheese should not be sold.

(*b*) *English Cheddar Cheese Makers' Federation.*—The general methods of working of the English Cheddar Cheese Makers' Federation resemble those of the Cheshire Cheese Federation.

Fig. 20

An annual subscription to cover the cost of grading, amounting to 1*s.* per cow kept, with a flat charge of 15*s.* for members with less than 20 cows, is payable by each member. As in the case of the Cheshire organisation, the grader periodically visits the members'

The English Cheddar Cheesemakers' Federation.

Examiner's Certificate for Farmhouse Cheddar Cheese.

Member's No.

I Hereby Certify that I have this day visited the Farm of

and have Stamped his Cheese with the Federation Trade Mark as under:

Maximum number of Points obtainable.		Date of Making.		Large Cheddars.	Truckles.	Points Scored.				Total.
		Month.	Year.			Flavour.	Texture, etc.	Colour.	Finish.	
Flavour ...	50									
Texture and Keeping Qualities...	30									
Colour... ...	10									
Finish... ...	10									
Total ...	100									

The Federation Trade Mark must not be stamped on Cheese scoring less than 90% of the above maximum number of points.

Date of Visit..... *Signature of Examiner*.....

farms and grades their cheese according to the scale of points shown on page 71, grading each cheese individually. The grader affixes the trade mark (Fig. 20) to all cheese securing 90 per cent. or more of the total points. He also makes out in triplicate a grading certificate (see opposite). The Cheddar Federation does not make the application of the mark conditional on a minimum percentage of fat in the moisture-free substance of the cheese.

(iv) Suggested National Mark Scheme.

Apart from the improvement of cheese marketing methods which they have pioneered, the two English grading schemes described above have been of considerable educational value, although they do not cover more than a small proportion of the total output of the varieties concerned. The time would now appear to be ripe for the development of a grading scheme, on a national scale, to embrace all the more important varieties of cheese produced in England and Wales, both farm and factory made, and involving the collaboration of all sections of the industry, both producers and distributors. The existing schemes include only two varieties of cheese and are operated by producers alone.

A basis for a wider scheme is provided by the Agricultural Produce (Grading and Marking) Act, 1928. Under this Act, the Minister of Agriculture is empowered to prescribe statutory grade designations for any kind of agricultural produce and to define standards of quality which are implied when such grade designations are used. The Minister also has power to establish a mark to indicate a statutory grade designation, and to authorise its application to such produce and by such persons as conform with conditions laid down. Under this Act, the National Mark for agricultural produce of England and Wales has been established, and voluntary schemes for the grading and marking of a number of agricultural commodities have been organised by the Ministry of Agriculture and Fisheries, in co-operation with the various interests concerned.

The characteristics of a National Mark grading scheme are that participation is entirely voluntary and that the grading is generally performed by the industry itself, its efficiency being maintained by the inspection of graded produce by or on behalf of the State.

(*a*) *Determination of Standards.*—The first step in the organisation of a National Mark grading scheme for cheese would be the determination of standards of quality for each variety. As has been pointed out, there are numerous minor differences in quality requirements between different markets ; with cheese, therefore, quality standards to be operative over the whole country can only be determined on broad lines. Moreover, it is impossible completely to define verbal quality standards for cheese, particularly in respect of flavour, so as to be capable of interpretation by any but a cheese expert. It is true that it is possible by verbal definition to exclude certain faults of quality. such as taints of various kinds

and defects of appearance. The most that can be done as regards flavour, however, is to state that it should be characteristic of the variety and to leave it to trained cheese experts to interpret this phrase. In short, the quality standard for the grading of cheese must, to a large extent, exist solely in the minds of those who perform the grading. As has been indicated, there already exists among cheese experts—factors, dairy instructors, and so on—a fairly close agreement as to the characteristic features of the variety of cheese with which they are concerned. It would therefore be a fairly simple matter for committees, composed of factors and producers of wide experience and of experts disinterested commercially, to reach agreement as to a complete standard—expressed and unexpressed—for each variety. Among other things, it would be necessary for a scoring table to be compiled, indicating the "weight" to be attached to each quality feature, the minimum total score and preferably the minimum score for flavour alone to be attained by all cheese graded.

(*b*) *Grading.*—Under the grading schemes of the Cheshire and Cheddar Federations, the grading is carried out by the Federation's grader before the cheese leaves the maker's dairy. Owing to the subsequent changes in quality which are liable to take place before sale to the retailer, however, a grade mark applied to cheese at so early a stage cannot be an absolute guarantee of its quality when the cheese is bought by the retailer. It is suggested, therefore, that, under a National Mark scheme, the final grading would not generally be performed at the maker's premises.

It is essential, however, that all cheese bearing the Mark should be made from whole milk, and this only the maker can guarantee. It is therefore proposed that the application of the National Mark should take place in two stages, of which the first would be the application of a mark by the producer—the "producer's guarantee mark"—guaranteeing the cheese to contain a minimum of, say, 45 per cent. of fat in the moisture-free substance, it being assumed that, provided a cheese were made from whole milk, it would contain at least this proportion of butter-fat (see pages 68 and 69).

The second stage would be the final grading of the cheese and the application of the National Mark. This would be performed within a few days of the cheese being dispatched to the retailer. Accordingly, those authorised to apply the Mark would for the most part be cheese factors or organisations of cheese-makers acting in the capacity of factors: cheese factory experts and cheese producers with a large retail connection might also be included. As has been indicated, any standard of quality for cheese must necessarily be almost entirely a matter of personal judgment; this makes it absolutely essential that all those applying the Mark should have a uniform conception of the characteristic features of the variety with which they are concerned. This can only be ensured by restricting the use of the Mark to persons of wide experience in the cheese trade,

Fig. 21.—Examination of Cheshire cheese in the course of grading.

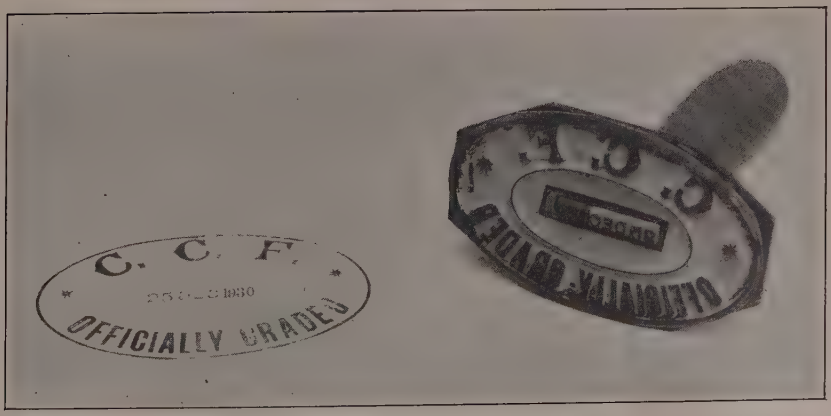

Fig. 22.—Official grade stamp of the Cheshire Cheese Federation.

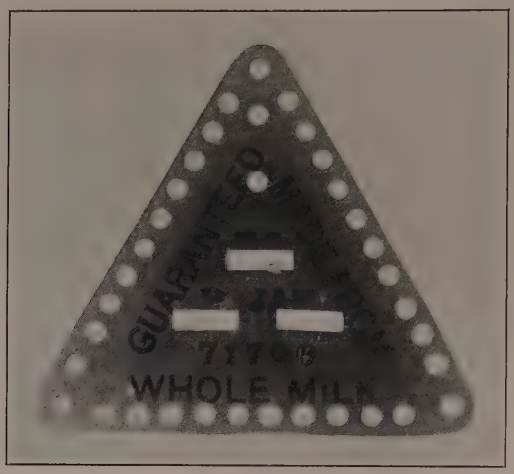

FIG. 23.—Casein plaque suggested as home producers' guarantee mark.

FIG. 24.—Cheshire cheese bandages. (Above—Scotch method. Below—English method.)

and for this purpose a minimum turnover qualification might be required of those to whom the right to apply the Mark was granted. The National Mark would only be applicable to cheese already bearing a "producer's guarantee mark."

(*c*) *Marking.*—The "producers' guarantee marks" (Fig. 23) might be of the type used under the Dutch system, viz., perforated casein plaques embedded in the rind of the cheese. The method of application of the Dutch marks at the production stage has been described (page 66.) In addition to the guarantee of minimum fat-content, it would be essential for the plaques to bear a serial number, enabling the producer to be identified, and a code number indicating the date of manufacture.

The method of applying the National Mark presents more difficulty. Various methods of marking cheese are described in Chapter X, some of which are unsuitable for this particular purpose. The mark used would require to be one which would remain visible on the cheese after the bandage had been removed by the retailer. Various instruments have been devised for hot-iron branding so as to leave an indented mark on the rind without damaging the bandage, but marking with a paper label sealed on to the rind by a film of transparent wax would appear to be the most satisfactory method, at present known, for applying the National Mark (see page 92).

A trade-mark, to be fully effective, should actually appear on the purchase taken away by the consumer. No method of marking bandaged bulk cheese so that each portion when cut up by the retailer may bear the Mark has so far been devised. It would, nevertheless, be possible for the consumer asking for National Mark cheese to make sure of obtaining the genuine article by insisting on seeing the Mark on the cheese from which the portion was cut.

(*d*) *Control Associations.*—As in the Netherlands, the issuing of "producer's guarantee marks" to makers and the keeping of records of serial numbers, to enable the maker of any cheese to be traced could best be performed by associations of producers of each variety. Such associations would stimulate active interest in the scheme on the part of producers; they would form centres of local propaganda in favour of grading; they would administer the scheme generally in relation to the individual producer; they would consider applications from producers for authority to apply the marks and would authorise them where the required conditions were fulfilled; they would also take action in the case of misuse of the marks by individual producers.

(*e*) *Inspection.*—A vital part of the National Mark scheme would be the State-operated inspection service. The impossibility of rigidly defining quality standards for cheese would make it all the more essential for the efficiency of grading to be maintained by

a system of inspection of graded cheese by an impartial expert, fully capable of appreciating the characteristic features of the variety of cheese with which he was concerned.

(*f*) *Probable Effects.*—The scheme would provide a means of rallying the home cheese industry to some form of collective sales propaganda based on the Mark. By specifying the National Mark product, the retailer buying home-produced cheese would be able to rely on obtaining not only produce of home origin but produce of guaranteed high quality. Retailer-demand for National Mark cheese would be reflected back to the producer through wholesaler-demand for cheese bearing the "guarantee mark", the National Mark being only applicable to cheese bearing the "guarantee mark" of the producer.

A National Mark grading scheme for cheese might thus be expected to raise the quality level of cheese produced in this country, as grading schemes have done in the case of other commodities. The results of cheese grading in Canada justify this expectation. Before the adoption of standard grades for cheese in Canada, little progress was made in the improvement of quality. With grading and the publication of grading records, however, a wider recognition of the importance of quality became apparent, so that a definite increase in the proportions of cheese classified in the higher grades has taken place. This is shown by the following figures :—

Year.	Boxes Graded.	Special and First Grades.	Increase, Special and First Grades.
		Per cent.	Per cent.
1923	1,458,129	78·0	—
1924	1,584,359	84·7	6·7
1925	1,895,112	85·9	1·2
1926	1,845,581	88·3	2·4
1927	1,472,333	87·4	—0·9
1928	1,567,182	93·1	5·7

These figures illustrate the efficacy of grading in stimulating a higher quality production. The important point is that an increase in the proportion of the total output which realises the best prices implies that relatively better returns accrue to the industry as a whole.

CHAPTER X.—MANIPULATIVE OPERATIONS.

(i) Bandaging.

For most varieties, the bandaging of cheese is a necessary part of the production process. It is usually done immediately after the

removal of the cheese from the press, and, in the case of many varieties, the bandages are retained for protective purposes up to the point of retail sale. The chief object of bandaging is to enable cheese to retain their shape in the early stages of ripening. Bandaging is therefore of greater importance for the larger cheese than for those of only a few pounds weight, since the greater mass of curd tends more easily to become mis-shapen unless adequately supported. It is also of importance in marketing on account of its effect on appearance.

Minor differences according to variety and local custom occur in the method of bandaging cheese. Thus, in England, the Cheddar practice is to affix circular caps of muslin to the top and bottom and to sew round the cheese a calico bandage equal in width to the height of the cheese. The cheese is further supported by a laced linen bandage (Fig. 24) which may be removed by the maker before marketing the cheese, or may be returned by the buyer when the cheese reaches his warehouse.* Cheddar cheese are shown for judging without the bandages.

Cheshire cheese are also capped and bandaged, but the bandages, instead of being sewn on as with Cheddar, are pasted on. No laced binder is used as with Cheddar, but, before dispatch from the farm, square cloths are placed over the top and bottom and tied together at the four corners (Fig. 25). For showing purposes, clean white bandages and new caps are substituted, the latter leaving exposed an inch and a half or two inches of rind around the outer circumference of the cheese. With coloured cheese, the small white caps show up the colour of the rind and improve the appearance.

A thinner cloth is used for bandaging Lancashire cheese than for either Cheddar or Cheshire. The bandage is from three to four inches wider than the depth of the cheese and thus overlaps the caps which exactly fit the top and bottom of the cheese. Strings are threaded round the edges of the bandages and are drawn up tight, coloured thread being sometimes used to emphasise the fineness of the work. The bandage is then sewn up, the sewing being very neatly and carefully done. The appearance of cheese of this variety is a matter of great pride to the Lancashire makers ; being comparatively soft and susceptible to damage by rough handling, the cheese are jealously guarded by the makers in storage, in transit and in the fairs.

Wensleydale cheese is not capped. The bandage, which is sewn on, overlaps about an inch at each end and is turned over to protect the edge of the cheese, the overlap lying flat on the ends. Some of the smaller cheese of this variety are put to press in an open cloth, almost a fine net, which takes the shape of the cheese in the press and serves instead of a bandage.

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* With Scotch Cheddar, one bandage from 2½ to 3 inches wide is applied spiral or puttee fashion, instead of the two one-piece bandages used for English Cheddar.

In the case of Derby, Leicester and Gloucester cheese, the caps and bandages are pasted on and no extra covering is used as in the case of the Cheddar and Cheshire varieties.

Caerphilly cheese, which are only 7 or 8 lb. in weight and flat in shape, do not require the support of a bandage. Stiltons are also left unbandaged so that the surface may be scraped and treated while the natural coat is forming ; during this period, the cheese are supported by loose cloths pinned to them, but these are removed when the cheese are transferred to the ripening room.

(ii) Dressing.

Several methods of dressing cheese are adopted, in this country and abroad, for protecting the cheese and for improving its external appearance.

In this country, after the bandages have been stripped off, the coat of the cheese is frequently scraped and rubbed over with butter or some other fat. In the case of Lancashire cheese, which have thinner bandages, this operation is frequently performed without removing the bandages or caps. Caerphilly cheese are dusted over with flour before marketing.

Abroad, the dressing of cheese for protection and for the improvement of appearance is most commonly practised in the Netherlands. Edam cheese, and to a less extent Gouda, are frequently stained red with aniline dye and coated with paraffin. The method adopted is as follows. If badly encrusted with mould or dirt, the cheese are scraped clean with a chisel-shaped appliance, while rotating on a machine. They are then washed in hot water, dried and stained ; these operations are carried out in a rotating drum, in which the cheese are consecutively treated with hot water for washing, hot air for drying and the aniline dye for staining. When the cheese have taken the stain, the dye is run off, they are dried again, and then immersed momentarily in hot paraffin wax. This forms a thin film over the cheese which protects it against mould-growth, checks evaporation, brings out the brightness of the colour and generally improves the appearance. Paraffining is practised to a small extent also in New Zealand and Canada, but as the retail trade in this country does not, on the whole, favour the waxing of cheese, the practice has not become general.

Oiling with linseed oil is a general practice in Italy with such cheese as Parmesan, Reggiano and Pecorino, which are first stained black, and also with some other varieties, such as Sbrinz and Canaletto, which are not stained. In the Netherlands, some of the Gouda cheese is similarly treated. The object is to make a smooth shiny crust, and the appearance of the cheese is much improved by the process. It is only applicable, however, to cheese of solid texture and body, with a hard rind.

The covering of mature cheese with bladder skins, as a protection against insects and moulds, is practised in the Netherlands with

Gouda cheese for export to tropical countries and South America, and in Italy with the Provoloni cheese. The bladder covering is transparent and at first sight indistinguishable from the rind, while it imparts no objectionable flavour to the cheese.

In certain countries, Canada and Italy, for example, external colouring is prescribed by law as a means of distinguishing margarine cheese or skimmed-milk cheese from whole-milk cheese. In several countries, for example, margarine cheese must be coloured red externally.

(iii) Processing.

The primary objects of processing are the arrest of ripening and the standardisation of quality, while the pre-packing of the cheese under a proprietary name affords a basis for effective advertising. The number of brands of processed cheese on the market is large and increasing, particularly those manufactured in Continental countries.

The processing of cheese is virtually blending, and whether the manufacture of "blocks" or "portions" is the end in view, the method adopted is the same. Bulk cheese, after removal of the rind, are ground down, treated with a chemical preparation for the emulsification of the fat, melted and run while hot and plastic into moulds of the required size and shape, lined with tinfoil, in which the cheese solidifies.

Cheshire, Cheddar, Lancashire and Wensleydale cheeses are successfully processed and pre-packed in England; the Cheddar variety is the only one put up in 5-lb. blocks. Of foreign varieties, Gruyere is the most extensively sold in pre-packed form in this country; the processed Gruyere has, to a large extent, supplanted bulk Gruyere.

Processing has considerable advantages in the marketing of cheese. Defects of texture and appearance are eliminated in the blending. The market is relieved of a considerable quantity of bulk cheese at a time when supplies tend to be excessive. Processing extends the demand for cheese; the small risk of deterioration enables many retailers to handle it who would not have sufficient turnover to stock the larger and more perishable bulk cheese; the attractive packing and elimination of waste appeal to the consumer; demand is also stimulated by the advertising to which trade-marked cheese of this type is well adapted.

(iv) Packing and Wrapping.

(*a*) *Home Supplies.*—The question of packs and packing is of minor importance in the trade in home-produced cheese, owing to the comparatively short distances over which the cheese is normally transported, and to the fact that cheese of most varieties are large and not fragile, thus travelling easily without protective covering. The use of unsatisfactory packages and even the common practice

of transporting cheese unpacked, are not, in this country, serious causes of loss of condition. The need of some form of protective package most frequently arises in the transport of soft cheese (see below), single cheese or very small consignments.

Lancashire cheese, however, are usually packed when transported by rail. The fragility of this variety makes it important to eliminate rough handling as much as possible. One type of package used is, in consequence, of such size that, when full, it can only be carried by four men, and rough handling is thus prevented by the weight. It is a returnable package.

The use of protective packages is also general with Stilton cheese. Being easily susceptible to damage, they are packed in strong, six-partitioned, returnable boxes with hinged lids. The package used for the considerable trade in single and half Stilton cheese between producer and consumer is a small non-returnable basket (Fig. 26) with a lid, in which the cheese is packed with straw for extra protection. The cost of these baskets in comparison with the value of the contents is trifling—only 3*d*. for a cheese worth about 30*s*. Baskets and boxes are used also for the consignment of single cheese of the larger varieties (Fig. 27). These, however, are returnable, and, as they require to be stronger owing to the weight of the contents, are more costly in proportion to the weight contained. Being made of standard size, they often do not fit the cheese exactly owing to unavoidable variations in the size of the cheese.

Soft cheese are dispatched from the Isle of Ely in strong, returnable, shelved, wooden boxes holding two layers of cheese, with six cheese per layer.

It is somewhat surprising that returnable containers, particularly for soft cheese, should still be largely used in preference to non-returnable packages. The latter have many important advantages, such as saving in transport charges and the elimination of the trouble of checking and returning which are associated with returnable containers.

For the export of cheese to tropical countries, a trade in which the Stilton variety figures largely, the practice is to enclose each cheese in a sealed tin. In order that the tin may fit as tightly as possible, it is often made up round each cheese separately.

The wrapping of ripened Stilton cheese in transparent cellulose paper has recently been introduced. Without concealing the appearance of the coat, the wrapper prevents the dust and mites from soiling other foodstuffs in the retailer's premises ; it also enables the maker to mark the goods with his name.

(*b*) *Imported Supplies.*—The long-distance transport and the number of handlings entailed in the importation of cheese into this country necessitate protective packing for all varieties. Cheddar cheese from Canada are packed singly in standard-size veneer boxes of the band-box type with overlapping lids, the cheese being entirely enclosed ; the boxes are also strengthened by

FIG. 25.—Cheshire cheese wrapped for transit.

FIG. 26.—Stilton cheese basket.

FIG. 27.—English Cheddar cheese hamper.

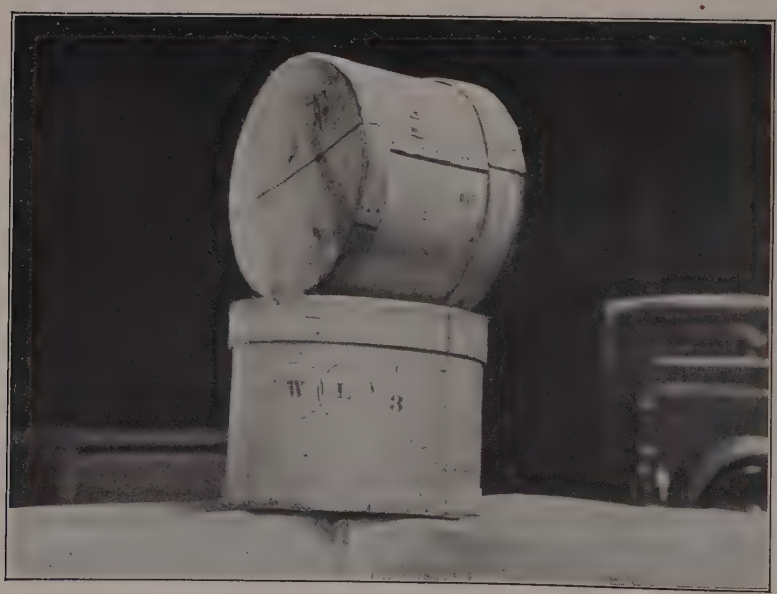

FIG. 28.—Canadian standard cheese box.

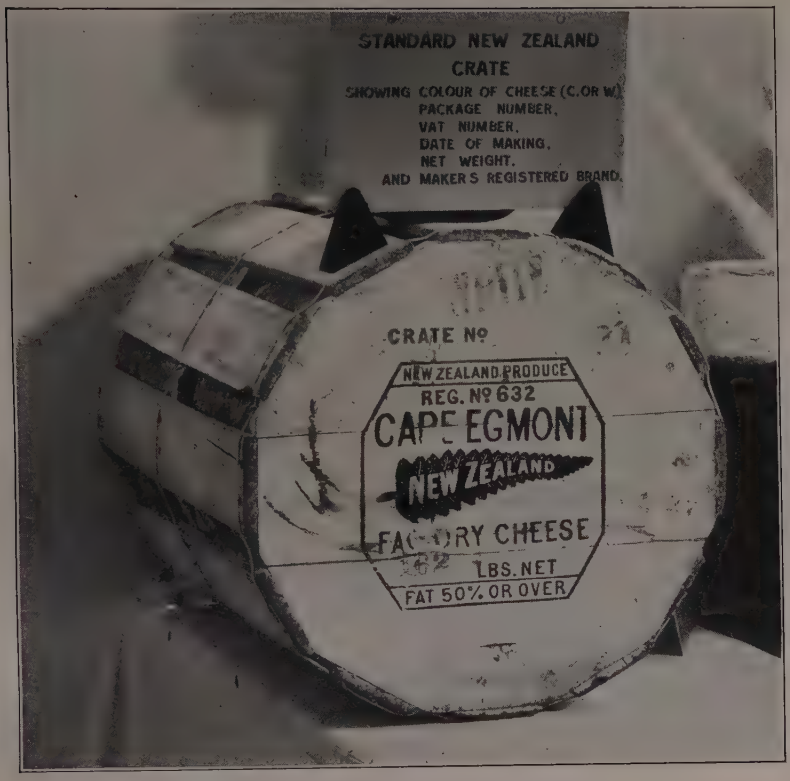

FIG. 29.—New Zealand standard cheese crate.

FIG. 30.—Gorgonzola cheese wrappings. (Above—wooden slat binder. Below—outer paper wrapper.)

FIG. 31.—Gorgonzola single cheese baskets.

FIG. 32.—Manufacturer's brand mark on Provoloni cheese.

a single surrounding wire (Fig. 28). These boxes frequently arrive broken, the weight of the package being insufficient to prevent throwing in handling. The cheese, however, owing to their solidity, are not often seriously damaged. New Zealand Cheddars are packed in standard double crates with solid ends, solid centre-board separating the two cheese, and sides consisting of vertical staves 27½ inches long and from 3 to 3¼ inches wide. The New Zealand crate (Fig. 29) is stronger than the Canadian box and, being twice as heavy when filled, is less roughly handled. Tight pressing of the crate, however, is apt to cause soft ends to the cheese, and a half-inch space should, therefore, be allowed between the cheese and the end of the crate. Cheese of English varieties produced in the Netherlands are also packed in wooden crates with octagonal solid ends, Cheshires in single crates, Lancashires and Leicesters in double crates with solid partitions. Gouda and Edam cheese for the tropics are packed separately in sealed fancy tins; for France, in separate cardboard boxes. Goudas for England are packed in crates, Edams and small Goudas in partitioned boxes. The hard cheeses of Switzerland and Italy are packed in crates and boxes for the American export trade; the largest, such as Emmenthal and large Provoloni, in separate boxes, and the smaller types, such as Pecorino and Reggiano, two or four in a crate or box. Gorgonzolas are protected by a binder (Fig. 30) made of laced slats of wood the depth of the cheese, surrounded by a paper wrapper, and are packed singly in straw in baskets. (Fig. 31). The softer Italian cheese, such as Bel Paese and Bella Milano, and the French soft cheese, such as Camembert and Brie, are packed in chip boxes.

(v) Pre-packing.

The pre-packing of cheese facilitates the application of brand names as a basis for advertising. Two classes of cheese are commonly pre-packed—the perishable soft cheeses and the processed cheeses.

(*a*) *Soft and Cream Cheeses.*—Camembert cheese of approximately 8 oz. in chip boxes, with the maker's label on the lid, have been on the market for many years, as also have cream cheese of from 2 to 4 oz. wrapped in muslin with an outer wrapper of greaseproof paper printed with the maker's name, or in tin-foil bearing the maker's label. The paper wrapper may show the date up to which the cheese may be considered as still fresh. In some cases, cream cheese are packed in cardboard cartons or in wooden boxes.

The sale of highly perishable cheese of this kind obviously calls for careful adjustment of stocks by retailers and entails frequent delivery, as well as prompt and reliable fulfilment of orders by makers; a rapid turnover is essential if the cheese are always to be sold fresh.

(*b*) *Processed Cheese.*—There are two methods of packing processed cheese. It may be either put up in 5-lb. blocks for the retailer to cut up on the counter, or pre-packed ready for the

consumer in small portions varying in weight from less than 1 oz. up to 1 lb., each separately wrapped in tin-foil. The pre-packing of the smaller portions of cheese was a development from the making of 5-lb. blocks, introduced to save the retailer the necessity of cutting up and weighing out the block and to allow the consumer to buy convenient portions of cheese which have not been exposed to contamination since leaving the factory. In the case of the 5-lb. block, both the tin-foil and the box are printed with the brand or the maker's name ; in the case of the small portions, a coloured printed label is fixed either to the tin-foil wrapping or, when each cheese is to be separately cartoned, to the carton itself.

For the small portions up to 2½ oz. in weight, the commonest type of container is a round, flat, cardboard box, in which the portions are packed as radial segments numbering 4, 6, 8 or 12 per box, each box usually holding a net weight of 8 oz. ; another, but less common, form of pack is that of rectangular portions packed in rectangular cartons.

(vi) Marking and Branding.

Marks or brands may be applied to cheese for two purposes—to indicate the type or quality of the cheese, or to identify the cheese as the produce of a particular maker, association or country.

The commonest method of marking cheese, and one applicable to all types, is by means of a paper label fixed to the rind or the bandage. This method is adopted both by makers and by merchants for trade-marking purposes ; it gives scope for the employment of attractive designs and colouring. As a means of advertising, marks of this type are most effective on small cheese that are sold direct to the consumer without being cut, but they are also used by the makers of several larger varieties. A wide use of paper labels has resulted from the recent introduction of processed cheese, each pre-packed " portion " of which bears a fancy label embodying a description of the cheese and the maker's trade-mark and name. Such labels would furnish a convenient and effective means in this country of applying the National Mark to processed cheese. In England, the labelling of bulk cheese is not common ; the cheese factor resents the use of any identifying mark by makers that might enable his retailer customers to establish direct contact with them. A paper label completely covering one end of the cheese is used by many Gorgonzola cheese maturers.

The method of branding with a hot iron heated over a flame is suitable for hard cheese with a smooth rind, but is little used in this country. In Italy, it is used both for private trade-marks (Fig. 32) and for marking margarine cheese so as to declare the nature of the fat used in manufacture. The Parmesan and Pecorino cheeses, besides the hot-iron branding, are also marked with a small, coloured, tin

plaque affixed to the side of the cheese and bearing the maker's name and trade-mark.

A further type of cheese branding is one recently introduced in the United States (Figs. 33 and 34), to meet the requirements of those cheese having a coating of paraffin ; but, since paraffining is not practised with English varieties of cheese, its adoption in this country is not feasible. The branding head, which is electrically heated, melts the paraffin coating of the cheese, thus permitting the inked type-face to deposit ink in the melted depressions. When the branding head is raised, the melted paraffin flows over the ink and encases it within the paraffin. Cleaning and re-inking are accomplished by means of a revolving brush and inking rollers which pass underneath the branding head. The cost of this machine is in the neighbourhood of £250. The brand is applied to the top of the cheese. As the depth of the cheese is only four or five inches, each wedge-shaped portion cut from the cheese bears some part, if not the whole, of the grade designation. This is repeated 24 times in half-inch letters on the 10-inch diameter face of the brand, which, when applied to the cheese, covers practically the whole top.

The casein-disc system of cheese marking adopted by producers in the Netherlands to indicate fat-content has already been described (Page 64 *et seq.*). In addition to this practice, the marking with an ink stamp of all English varieties of cheese made in the Netherlands and exported to this country is now required by the Dutch Government. (Fig. 14.) Two different stamps—one used with blue ink and signifying full-cream cheese, and the other with black ink and signifying half-meat cheese—are stamped on the respective types of cheese. The mark is applied in English eight times round the cheese on the outside of the bandage which, if clean and of a fairly open texture, allows the ink to penetrate the bandage when it is wet and to appear also on the rind of the cheese when the bandage has been removed.

Marking with an ink stamp is one of the features of the grading schemes operated by the two English cheese-makers' federations. The trade-mark is stamped once on the bandage, in black ink in the case of the Cheshire Federation, in green in the case of the Cheddar Federation. In neither case is the mark seen by the consumer on the purchased cuts, because it does not penetrate the bandages and these are customarily removed by the retailer before cutting the cheese ; even if the bandages are retained on the cheese, all except a very small portion of the cheese bears no mark at all when bought by the consumer. The principal use of the mark in such circumstances is to create confidence on the part of the retailer in the quality of the cheese bearing it.

Unless the mark is ineffaceable, prominent and sufficiently apparent, either by its size or by the number of times which it appears on the cheese, the marking of cheese tends to be ineffective

from the standpoint of the consumer. The problem of devising a suitable method of marking cheese of English varieties must also take into account the fact that the most important varieties, such as Cheshire and Cheddar, are contained within a bandage until exposed in the retail shop ; before cutting the cheese, the retailer, as previously stated, removes this bandage and, if necessary, also scrapes the rind of the cheese clean. As grading and marking must, obviously, take place prior to the retail stage, the mark must therefore be applied to the bandaged cheese and to be of maximum benefit should also be visible on some part of every cut when the bandage has been removed and the rind of the cheese cleaned.

The inked rubber stamp, for example, while satisfactory with clean, open-textured bandages when wet, is not effective in getting the ink through a dry or a soiled bandage closely knit to the rind, and, since much of the English cheese, particularly Cheddar, is aged and the bandage in this condition when the cheese is ready for marking, this method is not effective for marking the home product for quality as a whole.

The most satisfactory method of marking bandaged English cheese which has so far suggested itself is one involving the use of a two-piece panelled cap (Fig. 35), which is applied to the cheese in the ordinary way after manufacture. Later, when the cheese is ready for marking, the panel is removed, thus exposing the "producers' guarantee mark," and a paper label bearing the National Mark is placed on the exposed surface of the rind and sealed down with a film of transparent wax. Cheese of varieties, such as Stilton, which are not bandaged can be similarly marked by applying a paper label and coating of wax direct to the uncovered rind.

The use of a mark of this type has considerable advantage over any other method that has been applied to bandaged cheese, in so far as it does enable the mark to be identified after the bandage is removed and, therefore, in the case of a grading scheme, permits of the checking of the grading when the cheese is in course of retail sale. For this reason, it is advocated as a means of applying the National Mark to home-produced cheese (page 83). Admittedly, it does not ensure that the mark appears on every cut ; how to ensure this is a problem which, doubtless, will be solved in time.

In addition to the marking of cheese itself, the packages are also frequently marked, while the labelling of wrappers is a feature of the packing of soft cheese. In those countries where a system of control of quality of cheese for export is in operation, it is usual for the packages to be marked with a national control mark and/or a grade designation mark. In several countries, this is, in fact, the only marking adopted, no mark being placed on the cheese themselves. Such marks are obviously only of value up to the point when the cheese are removed from the package. This is usually done by the retailer, except in the case of shopkeepers who buy their cheese in small quantities.

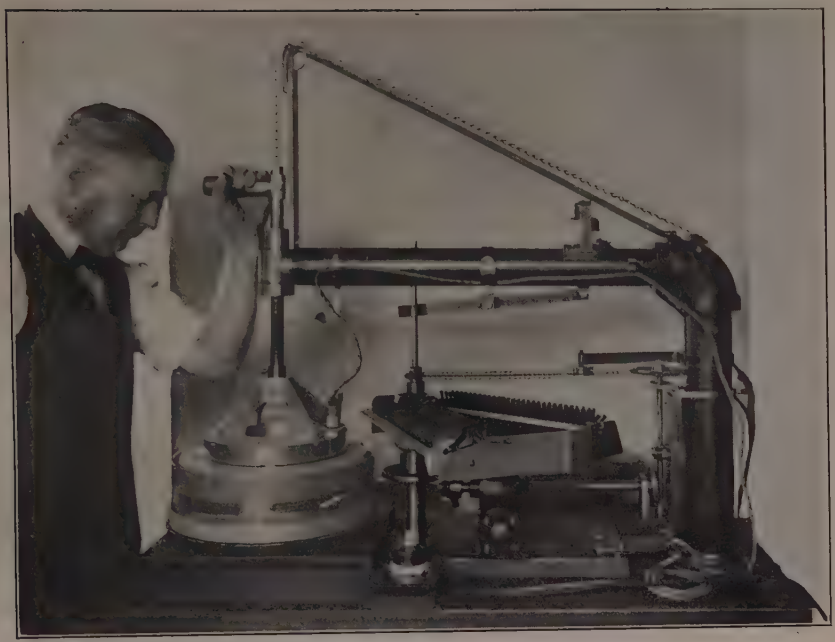

FIG. 33.—U.S.A. cheese branding machine.

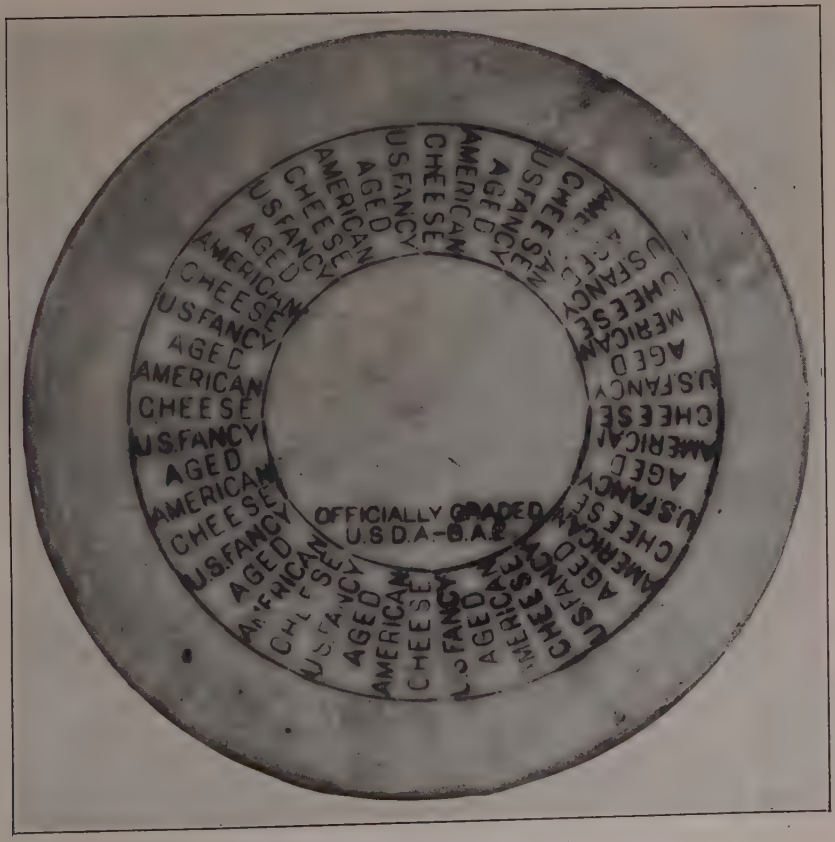

FIG. 34.—Branded American cheese.

FIG. 35.—Panelled cap for cheese as suggested for the National Mark scheme.

FIG. 36.—Whitechurch Cheese Fair.

PART III.—COUNTRY WHOLESALING.

CHAPTER XI.—DIRECT SALE TO RETAILER.

(i) By the Farmer.

Direct dealings between farmer and retailer constitute only a small proportion of the total wholesale trade in home-produced cheese. Cheese from a dairy with a known reputation for continuous supplies of consistently high quality is in keen demand, and, when a reliable source is discovered, the retailer often prefers to deal direct with the maker rather than to depend on the factor.* The retailer's turnover, however, must generally be sufficiently large to absorb the entire make of the dairy from which he buys, since makers prefer to sell their whole output to one buyer.

Generally, variations in quality necessitate the buyer visiting the maker's store to inspect the cheese before purchase; this involves an expenditure of time and trouble which the retailer is not usually prepared to undertake. Further, the retailer finds his business dealings easier to conduct with the factor than with the farmer. The factor is more conversant with business practices and market tendencies, and, as a result, disputes as to prices, weights and quality are less frequent.

Where direct sale to the retailer is the practice, the market fluctuations through the season make it difficult to arrange a forward contract price. When confidence is established, the price is often left to the retailer; the cheese are sent in as required or as the maker is ready to dispatch them, and are valued on receipt by the retailer.

A few makers of hard-pressed varieties have a regular trade in small consignments to retailers, contact having probably been made in the first place through successful exhibits at shows. Dealings of this kind, however, are common only with makers whose produce is of especially high quality.

Retailers in the cheese-producing areas have greater facilities for buying direct from the maker than those elsewhere. Where a retailer's business is situated close to the maker's dairy, he may, instead of buying for cash, exchange other provisions and groceries for cheese and butter supplied. The proportion of the total make of cheese in any of the main producing areas that can be consumed locally is, however, small, except in some districts, such as the Yorkshire Dales.

(ii) By the Factory.

Factory-made cheese is sometimes sold direct to retailers. This is notably the case with the Stilton cheese factories, which, in autumn

* *See* next Chapter.

send representatives to the London stores to obtain orders for cheese for the Christmas trade. The Stilton factories usually sell in parcels according to the retailers' requirements, selecting the cheese to meet the order, or allowing the buyer to do so, and placing them on one side for delivery as required. In many cases, direct business contact is established between cheese factories, or creameries producing cheese as a by-product, and the large multiple-shop firms. Much factory-made cheese, however, particularly in the case of farmer-controlled factories, is sold through factors, as in the case of farm-made cheese. Cheese factories controlled by dairy firms with urban retailing interests have an outlet for their produce through their own shops.

CHAPTER XII.—THE CHEESE FACTOR.

(i) Functions.

The cheese factor, as a specialist country wholesaler, has played a part in the marketing of cheese from as far back as the 17th century. His functions include the assembly of supplies from numerous makers, storage and subsequent selection and dispatch to wholesale and retail distributors in the consuming centres. These functions necessitate skilful buying, the provision of warehouse accommodation, the granting of credit to buyers and, in some cases, to cheese-makers, as well as a precise knowledge of the requirements of each of his customers. In this pivotal position the cheese factor is well placed to feel the pulse of the market and to interpret the state of supply and demand.

Because of the numerous variations in quality and type which are characteristic of home-produced farmhouse cheese, and the differences in local taste which have developed from these variations, the selective function which the factor performs is specially important. He gets to know by experience the characteristics of the cheese of his regular suppliers, as well as the individual requirements of his customers, and is thus in a position to direct supplies into the most appropriate channels. This is a valuable service. If, for each variety, standards of quality were recognised at which makers could aim, the selection of farm-made cheese for the consumers' market would be simplified, though it would never be eliminated; even Canadian and New Zealand cheese—the most standardised on the market—undergo some selection before being distributed to the retailer.

Cheese factors, while handling any variety of cheese for which they have sufficient enquiry, are usually specialists in one variety. They have their warehouses in or near to the district in which that variety is made, and their skill in judging quality and value is naturally greatest in respect of that variety. The nature of the factor's business in England differs slightly from that in Scotland;

whereas the former usually sells direct to the retailer, the more general practice of the latter is to sell to a distributing wholesaler. In England, indeed, the cheese factor acts as the principal intermediary between the maker and the retailer. In the case of Cheshire cheese, for example, it has been stated* that 90 per cent. of the whole annual make passes through this channel. The proportion of Cheddar, Lancashire, Caerphilly and Stilton cheese handled by factors is also high. Some of the wholesale provision houses in the large towns and cities perform the function of cheese factors, employing one or more of their staff solely or primarily for the purpose. The Co-operative Wholesale Society also functions in this way, buying directly from farmers and also from producers' co-operative and other factories, principally in the Cheshire district, but also in Somersetshire and Leicestershire.

The factor's share in the responsibility for storage and ripening of cheese is discussed in Chapter XIX, page 133.

There are probably between 60 and 70 specialist cheese factors in England and Wales. There are three associations of factors—the Lancashire and Cheshire Cheese Factors' Association, the Cheddar Cheese Factors' Association and the Caerphilly Cheese Factors' Association.

(ii) Methods of Purchase.

Apart from the fact that modern developments of transport and communication have facilitated operations, the business of the cheese factor has altered little within the last hundred years. In some districts, the introduction of cheese fairs has provided an alternative means of purchasing supplies, but, in spite of the increased importance of some of the fairs, the greater proportion of home-produced cheese is still purchased at the maker's dairy or at the factory; few factors make the bulk of their purchases at the fairs. Generally, the longer the firm has been established, the wider is its permanent connection with cheese-makers and the less the need for obtaining regular supplies through the medium of the fairs.

Factors usually buy the cheese outright; in some cases, they act as brokers for the producers, charging a commission varying from 2 to 5 per cent. of the selling price. Except in the commission business, purchases are made on inspection, either at the farm or factory, or at the fair. In the case of purchases at the farm or factory, the factor visits the dairies on his books at intervals of from a few weeks to a few months, the frequency of the visits depending on the movement of cheese from his warehouse, on anticipated demand, on supplies available and on the general state of the cheese market. Unless stocks are moving rapidly, the visits tend to be at longer intervals on a falling market than on a

* Linlithgow Committee Report on Milk and Dairy Produce. Cmd. 1854/1923.

rising market, when supplies are bought in as often as the makers will sell. In any case, however, visits are not delayed so long as to sacrifice the confidence of the supplier. A close business relationship gradually becomes established between the factor and the maker, and dealings are so regular that the factor comes to regard some of his suppliers as " his " dairies and the cheese-makers speak of " our " factor. Other factors do not poach on these " preserves " without definite invitation from the makers.

In the maker's cheese store, the factor first appraises the cheese roughly on their appearance, picking out, for separate price negotiation, any that are obviously faulty. By boring a few of the remainder, he forms a more accurate estimate of their value. The purchase price may be agreed on the basis of the local cheese fair quotations, or the maker may leave the price to the factor, knowing that if his dairy has a reputation for high quality, the fear of losing his supplies will compel the factor to pay the full market value. On the other hand, the price is at times the subject of much argument and close bargaining. The quantity of cheese to be taken on each visit is also a matter for negotiation in which the wishes of seller and buyer are generally opposed. In addition to the general quality, the preferences of his customers as regards, say, colour and texture, influence the factor's estimate of what the cheese are worth to him. A shortage of stocks of cheese of the special characteristics required may prompt him to pay a higher price. The converse also holds good.

The cheese after purchase is usually taken to the factor's warehouse. Where road transport is used, the cheese is usually collected by the factor. In the case of rail transport, the farmer may arrange for the cheese to be put on rail to the factor's railway station. In any case, the cost of transport from the dairy to the factor's warehouse is allowed for in arriving at the purchase price. The cheese are weighed into the factor's warehouse and the recorded weight forms the basis for payment. In the North and Midlands, the lb. is the unit of quotation; in the South-West, the cwt. The farmer may weigh the cheese before they leave his dairy, as a check on the factor's weighing, or he may himself see the cheese weighed into the factor's warehouse. If dispatched by rail, the railway company's weight serves as a check on the factor's.

When cheese is bought at a fair, it is customary for settlement to be made the same day; cheese bought at the farm is usually paid for within a week of being received in the factor's warehouse.

The trade of a cheese factor calls not only for business ability but for personal skill in the recognition both of general quality and of the fine shades of flavour that will satisfy the individual requirements of his customers. His task is made easier if he is able to keep customers continually supplied with the produce of a particular dairy. Customers and retailers are quick to notice changes in the quality and character of cheese, and a permanent

connection with makers of good repute, or who make cheese of a type which consistently satisfies a particular market is, in consequence, a great asset. Only a part of the cheese factor's trade, however, is of this regular nature. The remainder of his business consists of buying cheese to go into the warehouse to meet orders as they arise and of obtaining cheese to fill orders, already received, at a stated price. The question of a competitive price is a major consideration in business of this type, and supplies may be obtained at fairs as frequently as at the maker's premises.

(iii) Methods of Sale.

At one time, it was the practice of the retailer and town wholesaler to buy at the factor's premises, where they could see the quality and character of the cheese. Nowadays, however, retailers buy extensively, through the post or by telephone or telegraph, without prior inspection, the buyer relying on the factor to supply cheese of the required type. This tendency is by no means confined to cheese. It is characteristic of the modern retail grocer that he spends more of his time in his shop and less in seeking out goods of the quality required. Purchases of cheese from factors by post or telephone may be made on sample; whether a sample is submitted or not depends on the confidence of the purchaser in the factor's knowledge of his requirements. Sales are also made by travellers, who may be either employed by the factors or working independently on a commission of from 1 to 2 per cent. Weekly or periodical price quotations are often forwarded to customers on the factor's books in order to keep them informed of price changes. With the Wensleydale variety, which in the mining districts of Durham is sold in a very fresh state, the factor's delivery vans call regularly on the retailer for the purpose of replenishing stocks.

The factor's terms of sale are usually 2*d*. in the £ discount for payment in 30 days, 1*d*. in the £ for payment in 2 months, with 3 months as the limit of credit.

CHAPTER XIII.—CHEESE FAIRS.

(i) Origin.

For many years, the cheese market or fair has been a characteristic feature in the marketing of cheese in this country. With the exception of the Highbridge auction, which was initiated and developed by a local firm of auctioneers, the fairs were originally promoted by farmers, usually under the auspices of a local dairy farmers' association. In some cases, the establishment of fairs was opposed by the buyers, who saw in them a move to break away from the practice of sale on the farms, which tends to restrict

competition and to hold the cheese-maker to the factor by custom if not actually by financial ties. In 1902, for example, the establishment of a fair at Nantwich, as a branch of the Chester fair, was so effectively opposed by the cheese factors that neither farmers with cheese nor factors with cheque-books appeared at the opening fixtures.

(ii) Location.

At the present time, ten cheese fairs are in operation in England and Wales ; they serve as an important means of disposing of farm-made cheese. Their relative importance differs according to the variety of cheese sold. Thus, while for Cheddar cheese there is no fair sufficiently important to influence or even reflect current prices, in the Cheshire cheese-making district there are several important fairs, the ruling prices on which are a true index of current values in the trade as a whole in that variety.

The regular and frequent fairs* for the different varieties are as follows :—

(i) *Cheshire Cheese* : Whitchurch, Nantwich, Chester, Wem, Market Drayton, Ellesmere and Shrewsbury.
(ii) *Lancashire Cheese* : Lancaster and Preston.
(iii) *Caerphilly Cheese* : Highbridge.

In addition, annual cheese fairs are held in several towns —*e.g.*, Stafford and Frome.

The relative importance of fairs in the marketing of the different varieties of cheese appears to be connected with the keeping quality of the cheese sold. The cheese fair has obvious advantages for the maker of short-keeping cheese. It gives him a greater choice of buyers than the method of sale on the farm, which, since he is compelled to sell quickly, virtually restricts him to the buyer who is in the habit of visiting his farm. With cheese of a long-keeping type a quick sale is less urgent, and such cheese can be held for a suitable offer. This may explain the fact that there is no fair devoted exclusively to the sale of Cheddar cheese, the longest-maturing English variety, although, in quantity manufactured, it is second only to Cheshire cheese.

Most of the cheese fairs are in the Cheshire cheese-making district, where a large proportion of the cheese manufactured, particularly in the early part of the year, is of a short-keeping type. Fairs are held once every three weeks at the seven centres enumerated above. That at Chester† is the oldest fair; those at Whitchurch† and Nantwich† the most important. Owing to the greatly increased demand for milk from the south Lancashire towns, the centre of the Cheshire cheese-making district has tended

* For dates of cheese fairs, see Economic Series Nos. 14, 19 and 23, Appendix II.

† *See* Economic Series, No. 14, pages 28 and 55.

to move southward towards Whitchurch and Nantwich, and the quantities of cheese pitched at these two fairs are larger than at any other fair in England.

Lancashire cheese, a relatively early-maturing variety, must be sold at fairly frequent intervals, and the quantities of cheese offered at the Lancashire fairs, although not so large as those in the Cheshire district, represent a considerable proportion of the total make. The Lancashire cheese fairs are held monthly at Preston* and Lancaster,* of which the former, established about 1845, is much the more important. Preston is well situated geographically, with reference both to the Lancashire cheese-making district in the north of the county and to the densely populated industrial district of the south. Its proximity to the consuming district attracts wholesale provision merchants and retailers to the fair and thus increases competition. The fair is well organised and well supported, and the quantities of cheese pitched are, on the whole, increasing. The fair exerts a strong influence on the trade in Lancashire cheese. Cheese shows or competitions are held in connection with the fairs both in Lancashire and Cheshire.

Three unsuccessful attempts have been made during the present century to start cheese fairs in other centres in Lancashire, viz., at Blackpool, Garstang and Manchester. In 1907, the Blackpool Corporation Markets Committee, in reponse to local desire, established a monthly cheese fair, which, though it continued till 1917, never became important ; it existed chiefly for the sale of locally made cheese to local provision merchants. At Garstang, which is in the centre of the cheese-making district—the Fylde—the Parish Council in 1921 organised a monthly cheese fair, which, however, did not continue beyond the end of that year. With the object of selling their cheese within the consuming district, some of the Lancashire cheese-makers, in co-operation with the Manchester Corporation, established a cheese fair in that city in 1926. It was poorly supported by makers and practically boycotted by factors, and, consequently, lasted for only three or four months.

The only other cheese fair of importance is the weekly auction at Highbridge (Somerset),† where the main business is the sale of Caerphilly cheese ; a few Cheddar cheese, mainly "truckles," are also sold, but their quality is seldom of the finest and the prices made are no guide to Cheddar cheese prices as a whole. This fair, however, handles a large proportion of the output of Caerphilly cheese, and the prices realised largely govern those paid for the cheese of that variety sold on farms. Buyers are mainly cheese factors, either from South Wales or with premises in or near Highbridge. The distance from South Wales, where 95 per cent. of the Caerphilly cheese is consumed, prevents the attendance of wholesale or retail provision merchants from that district.

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* *See* Economic Series No. 19, pages 71 and 66.

† *See* Economic Series No. 23, page 78.

The fairs previously held in Derbyshire have been discontinued owing to the decline in the manufacture of the local variety. The fairs for the sale of Stilton cheese at Leicester and Melton Mowbray, once a comparatively important means of disposing of this variety, were discontinued during the War and have not been resumed.

In addition to the regular cheese fairs, which are entirely devoted to the sale of that commodity, cheese is sold in some of the country produce markets, along with eggs, rabbits, butter and poultry. This occurs particularly in Durham and the North Riding of Yorkshire, where Wensleydale cheese is bought by dealers at such markets as Barnard Castle, Richmond and Leyburn. In Dorset, some of the poorer qualities of " Blue Vinny " cheese are sold by auction in Dorchester market : the quantities thus sold, however, are small, most of the cheese of this variety being purchased direct from the makers' dairies.

(iii) Procedure.

The Cheshire cheese fairs are held under cover, usually in the public market hall. The principal fairs—at Whitchurch (Fig. 36), Nantwich and Chester—occur in consecutive weeks.* The cheese is brought in by the makers on the previous afternoon and evening and also on the morning of the fair. (Figs. 37 and 38). Each lot is weighed as received (Fig. 39), and numbered in sequence with the number appearing on the weighing-in docket. The official weight forms the basis for payment by the buyer. After weighing, the cheese are placed, in separate lots, on straw on the floor of the hall, in avenues separated by gangways sufficiently wide for the free movement of those attending the market.† Cheese are not piled more than two high if it can be avoided. Pitching tolls at the rate of 5*s.* per ton are payable by the makers. No cheese may be bored until the ringing of the bell which signifies the opening of the fair, usually at 10 o'clock.

Sales are by private treaty, the makers or their representatives standing by their lots and bargaining with the buyers, who move from one lot to another looking for suitable purchases. The buyers judge the quality of the cheese, to some extent, by its external appearance. The quality is further tested by feeling the cheese and, if the impression gained from this preliminary examination is favourable, by boring ; in such cases, a sale may be quickly effected. It may even be arranged in advance of the fair that a factor is to take the lot of a certain maker at, say, the ruling price at the fair for finest cheese ; it is usually only finest cheese, however, which is sold on such conditions. At the other extreme, bargaining may be protracted and the price finally agreed upon may even involve splitting a difference of $\frac{1}{4}d.$ per lb. As a compromise in some

* *See* Economic Series No. 14, Appendix II.

† *See* Economic Series No. 14, Figure 2.

FIG. 37.

FIG. 38.—Delivering cheese to the fair.

FIG. 39.—Weighing-in cheese at the fair.

FIG. 40.—Retail cheese stall at a local market.

protracted dealings, the factor may agree to the higher figure demanded by the maker on the understanding that the factor is allowed some rebate on settlement. The maker then has the satisfaction of being able to quote the higher figure as the price realised by his cheese. In the process of examining the cheese and negotiating as to price, the factor displays considerable skill in deprecating its value. The maker, on the other hand, tends to over-rate the value of his product, but he is generally at a disadvantage in bargaining as he has little opportunity of tasting and judging cheese other than his own. On a falling market the maker suffers more for his ignorance of comparative value than on a rising market or when demand is brisk.

When a lot is sold, the fact is indicated by placing on it a wisp of straw or the buyer's card. During the progress of the fair, the secretary, by questioning makers and buyers, ascertains the prices that are being realised. This calls for discretion, since the maker naturally tends to exaggerate and the factor to understate the prices. The information obtained forms the basis of the official price quotations for publication in the local press.

No cheese may be removed from the fair until the ringing of the bell—at noon or some other fixed time—indicates that the fair is over. Settlement is normally made immediately the fair is closed. The cheese is removed during the afternoon, the factors' employees marking the lots for identification on receipt in the warehouses.

At the Lancashire fairs, which are held monthly except in December,* the practice differs little from that in Cheshire. At Preston, where the covered market is open on all sides† it is not possible for cheese to be brought in on the previous day. The necessity for all the cheese to arrive on the morning of the fair precludes the weighing-in of cheese as it arrives, owing to the congestion that would be caused. The cheese are, therefore, pitched in lots in a single layer on straw, in rows separated by gangways wide enough to permit a movable weighing machine to be taken round to weigh each lot, either before the fair commences or during its progress.

The special feature at Highbridge‡ is that the bulk of the cheese is sold by auction instead of by private treaty. The cheese are weighed-in as received and placed in lots on the floor, the auctioneer and the buyers moving from one lot to another as each is sold. The auctioneer's selling commission is 1*s.* 6*d.* per cwt.

(iv) Importance.

The total turnover of cheese handled at the fairs is probably not a high proportion of the total output in this country. The annual turnover at five of the principal fairs, from 1925-9 inclusive,

* *See* Economic Series No. 19, Appendix II.

† *See* Economic Series No. 19, Figure 28.

‡ *See* Economic Series No. 23, page 78 and Figure 21.

is shown in Table VII on page 150, The importance of the fairs cannot, however, be measured entirely by their turnover. They have an important influence, at any rate so far as Cheshire, Lancashire and Caerphilly cheese are concerned, on the prices of cheese throughout the country. They provide an opportunity for the free play of the forces of supply and demand such as is not afforded by the system of private negotiation on farms, and, given proper dissemination of accurate market reports, they are capable of establishing for each variety a fair measure of price stability throughout the country. In practice, the prices made at the fairs are adopted as the basis for a large number of transactions on farms. Farmers, indeed, often attend the fairs merely for the purpose of keeping in touch with the trend of prices. Where fair prices are thus used as the basis for private dealing, the price adopted is generally the " top-of-the-fair " price. This price, therefore, is the most important figure quoted in market reports ; in the official quotations issued by the fair authorities, it represents the average prices paid for finest cheese by factors, and not those realised by isolated special lots or paid by cutters for small parcels.

In view of the use that is made of the " top-of-the-fair " quotations in making informal contracts and in bargaining, it is clearly in the interests of the producers that the fairs should be patronised by the best makers and that a sufficient quantity of finest quality cheese should always be on sale. The finest cheese, however, is the easiest to sell at the farm and the supplies of finest quality offered at the fairs are, therefore, declining. This is reflected in the fact that some makers realise a fraction of a penny per lb. above the " top-of-the-fair " price for their cheese when sold to the factor at the farm.

There is no organised collaboration at the fairs among either the makers or the factors for the purpose of arranging prices. A considerable amount of informal discussion naturally takes place at the fairs among the factors as to what price to give and among farmers as to what price to accept. Generally, however, competition is free and prices move without manipulation in response to supply and demand.

CHAPTER XIV.—ORGANISED OR REGULATED MARKETING.

(i) General.

An efficient marketing system is one which ensures the supply of a commodity to the consumer in the quantity and the quality required, at the minimum of cost, while securing for the producer a return adequate to stimulate production on the required scale. Under an individualistic system, where the producer relies entirely on other agencies, themselves independent and unco-ordinated, to direct the supply of his goods to the distributive

machine, this ideal, in the nature of things, is rarely attained. Almost universally, producers of agricultural commodities are recognising this fact and, as a result, various forms of collective action for marketing purposes are being taken, or are contemplated by producers, in an endeavour to attain a more rational system of distribution.

Collective action of this kind in the cheese industry assumes two major forms—co-operative selling and the establishment of regulatory non-trading bodies which perform such functions as the maintenance of quality standards, including butter-fat control, or the carrying out of propaganda to stimulate consumption.

(ii) Co-operative Selling.

(*a*) *At Home.*—While cheese manufacture on co-operative lines is undertaken, to some extent, in this country, the co-operative marketing of cheese has never been attempted on a large scale. In a few instances, farmers' co-operative trading associations sell members' cheese as an incidental activity. In such cases, the co-operative society operates virtually as a factor, the cheese being sent in to the warehouse by the makers, where it is priced, selected, and re-dispatched in parcels to buyers, the suppliers being usually only a limited number even of those who buy their requirements of feeding-stuffs, manures and machinery through the society. Effort of this kind is purely local and cannot effect any improvement in the efficiency of the marketing system as a whole. The example of the Netherlands (see below), where a large proportion of the total cheese output both of farms and factories is marketed by co-operative export societies, indicates that in this country, also, where most of the cheese produced is " exported " for consumption outside the areas of production, there may be scope for co-operative cheese selling by large ad hoc organisations of cheese makers.

As stated in Chapter XI, the co-operative cheese-manufacturing societies market their produce, to some extent, direct to the retailer, especially in the Stilton cheese district, although it is more usual for them to sell through a factor. It would seem to be worth while for the farmers' co-operative dairies in the Stilton cheese district to market their produce collectively, rather than, as at present, to compete with one another in selling.* The present concentration of supplies in a small number of large units situated within a limited area should lend itself to combined marketing. Both the selling and the factory management would gain in efficiency by specialisation. One radical difficulty which a Stilton cheese society experiences, under present circumstances, is that its manager, in addition to being a skilled cheese-maker, must also be a good salesman, with business knowledge, experience and ability. The establishment of a central sales system would obviate the difficulty and would enable a society,

* *See* Agricultural Co-operation in England; Horace Plunkett Foundation: London; p. 206.

when appointing a manager, to have sole regard to technical qualifications. The present method, adopted by the smaller societies, of leaving the selling to a member of the committee of management, who may not be specially qualified for the purpose, would also be eliminated.

A trading company—the Three Counties Farm Produce Agency, Ltd.—was formed at the beginning of 1930 by members of the English Cheddar Cheese Makers' Federation, for the purpose of marketing Cheddar cheese, graded by the Federation's grader, direct to retailers and. to some extent, to consumers.

(*b*) *In the Netherlands.*—The organisation of cheese-makers on co-operative lines for the export of cheese is highly developed in the Netherlands. In Friesland, where the cheese is exclusively factory-made, and in the other cheese-making districts, co-operative export societies handle a large proportion of the total output. It is customary for these societies to require a supply contract from their members, every member being bound to market all his supplies of cheese through the society to which he belongs. The societies buy the cheese outright from the makers, whether they are members of the society or not, and conduct all business connected with export, including warehousing, ripening and preparation for market. In some cases, the societies also manufacture processed cheese from their purchased stocks of bulk cheese.

The large proportion of the total Dutch output of cheese controlled by the co-operative export societies, and their close acquaintance with market conditions in the consuming countries, enables them largely to determine, subject to world conditions, the level of prices received by the Dutch producers.

(*c*) *In the New Zealand Trade.*—There are two somewhat remarkable instances in the New Zealand trade of producer-controlled marketing organisations which integrate both export and import functions.

One of these is a co-operative export house, known as the New Zealand Producers' Co-operative Marketing Organization, which works with a parallel importing house, the New Zealand Produce Association Ltd., with offices in Tooley Street, London. Approximately 100 farmers' co-operative factories in New Zealand are members of, and own share capital in, the New Zealand concern. The Co-operative Wholesale Society in England has capital holding in the importing house, to the extent of 50 per cent. of the total capital. Cheese is sent on consignment to the importing house, which sells direct to the C.W.S. and to other wholesale buyers.

The other marketing organisation is an importing house known as Amalgamated Dairies, Ltd., which acts as the London agency for the New Zealand Co-operative Dairy Co., a combine of co-operative dairy factories in the North Island, which holds 50 per cent. of its share capital. This concern deals not only with the produce

(Anchor brand) of the Dairy Company, but also with that of any other factories that may wish to pass their produce through its hands on a consignment basis. As an importer, it sells through a subsidiary concern known as Empire Dairies, Ltd., and through selected agents in Tooley Street, securing audited accounts-sales and returns of stocks.

(iii) Regulated Marketing.

Representative organisations for the purpose of controlling marketing policy, but carrying out no trading operations, have developed in recent years in a number of cheese-producing countries. In most cases, such organisations are statutory bodies whose powers are defined by law and on which the Government of the country concerned is represented, together with all classes of producers interested in the commodity and, in most cases, also the distributors of the commodity. Boards of this type, for example, exist in New Zealand and the Commonwealth of Australia, and a similar Board is about to be constituted in South Africa. Organisations of this type have, in certain cases, been voluntarily formed by the cheese industry itself.

(*a*) *New Zealand and Australian Dairy Produce Control Boards.*—The New Zealand Dairy Produce Control Board was set up under the Dairy Produce Export Control Act, 1923.* It is mainly representative of the milk producers and dairy produce manufacturers in New Zealand. Its personnel consists of two Government nominees, nine representatives of suppliers to dairy produce factories and one representative of merchants and proprietary factories. The functions of the Board, which does not itself participate in trading, include the raising of the standard of quality of butter and cheese produced in New Zealand, the control of shipments, the allocation of shipping space, the negotiation of freight and marine insurance rates and the improvement of shipping, handling and cold-storage facilities.

A London agency has also been established with the object of keeping the Board informed as to market tendencies and other matters relevant to the marketing of dairy produce in this country. The London agency also maintains widespread and continuous publicity in this country on behalf of New Zealand dairy produce. The Board made an attempt in the early days of its existence to control the prices of New Zealand dairy produce in this country by fixing a minimum price, below which such produce could not be sold, and by restricting the export of dairy produce from New Zealand. This policy, however, was not successful and was soon abandoned. The Board obtains the necessary funds for its operations from a statutory levy on all butter and cheese exported of

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* *See* Fourth Report of the Imperial Economic Committee on the Marketing of Dairy Produce. Cmd. 2725/1926.

$\frac{1}{32}d.$ per pound in the case of butter, and $\frac{1}{64}d.$ per pound in the case of cheese.

The Australian Dairy Produce Control Board is similar in its constitution and operations to the New Zealand Board.

(*b*) *South Africa—Dairy Industry Control Act*, 1930.—The dairy industry in South Africa has recently been placed under a scheme of self-regulation by the Dairy Industry Control Act, 1930. The main provisions of the Act, so far as they relate to cheese, are as follows :—

(1) It provides for the establishment of a Board of Control for the dairy industry, on which are represented all sections of producers—milk producers supplying creameries and cheese factories, butter and cheese-factory owners, and farm dairy butter-makers. Distributors of butter and cheese also have a representative on the Board.

(2) The functions of the Board include the co-ordination of the primary production, manufacture and marketing of dairy produce, the taking of measures to stabilise the prices of dairy produce in the Union, and generally advising the Minister of Agriculture on all matters relating to the development of the dairy industry.

(3) The Board may make a levy on all butter and cheese manufactured in, or imported into, the Union, of up to 1*d.* per lb. This levy may be expended, among other objects, in encouraging the export of butter and cheese from the Union by the payment of an export bounty of up to 6*d.* per lb. on butter and cheese exported, in propaganda to encourage the consumption of dairy produce in South Africa, and in assisting generally to develop and improve the dairy industry in that country.

(4) The Board may also require the export of determined quantities of butter and cheese and generally control the export of these commodities.

(5) All Cheddar or other hard-pressed cheese, as distinct from sweet-milk or Gouda cheese, must be graded according to Government regulations by a Government Inspector.

(6) No cheese factory is permitted to manufacture cheese unless it has on its staff at least one holder of a "Certificate of Proficiency" in cheese making. The basis of awarding the Certificates of Proficiency is an examination by two Government Inspectors.

(*c*) *Note on the Roquefort Cheese Industry.*—An interesting example of rationalisation, in both the production and the marketing of cheese, by purely voluntary effort on the part of producers, is provided by the Roquefort cheese industry in France.

This variety of cheese is made from sheep's milk produced, in an area extending over ten French Departments, by flocks varying in size from two or three sheep upwards. It is manufactured in a large number of dairies distributed throughout the milk-producing area. After manufacture, the cheese is transferred to the celebrated caves of Roquefort for ripening. The caves are owned by a comparatively small number of firms; for many years, a process of concentration of these firms has been in progress, and the majority of the caves are now controlled by one large society—"la Société des Caves"—which is an association of a number of previously independent units. This concentration process culminated in 1919 in the formation of a convention of all the firms engaged in cheese ripening at Roquefort. The financial and industrial autonomy of each firm and the identity of their individual trade-marks are retained. The convention has three main objects—to prevent over-production of the variety by allocating to each firm an annual quota based on its 1927–8 output, to fix maximum buying prices for milk and minimum selling prices for the cheese, and to conduct joint publicity in foreign countries in order to stimulate the export of Roquefort cheese. In this instance organisation has been facilitated by the fact that production, being dependent on the special ripening properties of the Roquefort caves, is necessarily restricted to a limited area and to a limited number of firms.

(iv) Possibilities in this Country.

There are a number of functions which could usefully be performed by varietal organisations of cheese makers and cheese factories in this country. The organisations could be either co-operative trading bodies or regulatory non-trading organisations, broadly corresponding in principle to the Control Boards set up in the Dominions for cheese and other products. Organisations of either type could (1) administer a system of cheese marking for the purpose of guaranteeing fat-content (pages 83 and 70); (2) directly or through accredited agents store and sell members' cheese and grade and mark under the National Mark; (3) regulate the flow of cheese on to the market and so avoid the flooding of the market early in the season with large quantities of fresh cheese such as is responsible for the low prices of Cheshire cheese in spring; and (4) carry out large scale publicity on behalf of the variety concerned. Some of these operations would seem to require concerted action by all producers. The Agricultural Marketing Bill introduced into Parliament in August, 1930, was designed to secure such concerted action if and when producers desire it.

PART IV.—DISTRIBUTION.

The machinery for distributing cheese in the consuming centres is also concerned with the handling of other dairy produce, notably butter.

CHAPTER XV.—THE IMPORTER AND TOWN WHOLESALER.

(i) The Importer.

By far the greater part of the cheese import trade in this country is carried on by about 30 large firms operating from Tooley Street, London. It is true, of course, that imported cheese arrives at other ports than London, but even so—at least in the larger ports such as Liverpool and Bristol—it is usual to find much of the trade in the hands of branches of the various London houses. The Co-operative Wholesale Society, with headquarters in Manchester, is also one of the largest importers of cheese, either directly or through a joint company of which it forms part (see page 104).

The function of the importer is that of concentrating supplies from overseas countries and feeding the market in accordance with demand. This involves a number of services, including the advance of credit to the shipper or overseas producer, the provision of warehouse or storage accommodation, the finding of markets for overseas sellers and the filling of orders for buyers in this country.

Importers include both principals buying outright on their own account and agents (or brokers) working on a commission basis. Few importing firms confine themselves strictly to one or other of these capacities.

If cheese is bought outright, the terms may be c.i.f. or f.o.b. If handled on commission, it may sometimes be dispatched direct from the exporter to the buyer on the advice of the importer (or broker) through whom the transaction has been effected. In the case of outright purchase, the merchant bears all the risks of marketing the produce, including those of deterioration of quality, loss in weight and a falling market, and depends for his profit on his ability to buy and sell to advantage. Sale on commission, on the other hand, frees him from any responsibility, except that of a bad debt; he receives as remuneration a percentage of the selling price, the price actually realised being returned to the shipper or exporter, less commission and other charges, the commission charged being from 2 to 2½ per cent.*

Importers may be classified into those who handle "Colonial" cheese (New Zealand, Canadian and Australian cheese of Cheddar type) and those who specialise in cheese from various Continental

* *See* also Fourth Report of Imperial Economic Committee, Cmd. 2725/1926, page 62.

sources. Producers and exporters in countries such as the Netherlands and Italy, however, usually maintain their own selling staffs or branches in London, and, since Continental cheese forms so small a proportion of the total imports, the term "importers," as representing independent firms of merchants or brokers, tends to be used almost exclusively with reference to those concentrating on Dominion supplies.

In the case of New Zealand cheese, sale on commission is more common than purchase outright by the importers. The long distance over which the cheese has to travel considerably increases the importers' risks under the latter method. The London importers usually have their own branches or agents in New Zealand who establish direct connections with the cheese factories and make the necessary arrangements for purchase or consignment on the advice of cablegrams from the London office. When sent on commission, New Zealand cheese may change hands in transit, but this is always at the instance of the shipper, since supplies are forwarded on the understanding that they shall not be sold by the importer till landed. In some cases, factories sell the whole or a portion of their output for a stated period on f.o.b. terms, but this practice varies considerably according to market conditions and prospects.

With a few exceptions, Canadian cheese is dealt with, in the first instance, by exporting firms who buy from the factories at the various produce exchanges or "boards" in Canada, and transfer the cheese to their own warehouses from which it is exported. In a few cases, United Kingdom importers are represented directly in Canada, but within the last twenty years it has become increasingly common for the Canadian exporters to sell to importers in this country in the ordinary way. The relatively short period elapsing between dispatch from Montreal and arrival in this country lessens the risk of market fluctuations during transit, and for this reason the bulk of Canadian imports are either bought outright by the importer or shipped direct to buyers through a broker who has sold the cheese before placing the order with the exporter.

In spite of the fact that Canada sends to this country only about one-half the quantity of cheese sent by New Zealand, more importers, as buyers, are interested in Canadian than in New Zealand cheese. New Zealand shipments are too large for the smaller importer to handle directly, while the usual terms of payment for New Zealand cheese are less favourable to the small man ; New Zealand drafts are all at "sight" as compared with Canadian bills which are drafted for 30 days.

Where cheese is purchased outright, the Canadian exporter receives his money from the bank in Canada by sale of a draft on the English buyer, with shipping documents attached ; in the case of New Zealand exports, the factory is paid, under special clause, as soon as the cheese is received into the Government Grading Store

for shipment, by means of an Importer's Letter of Credit to the bank in New Zealand. The importer's New Zealand agent then draws a draft on the English importing house with shipping documents attached in the usual way. In commission business, the importer generally finances the consignments by advancing a percentage of the estimated selling value of the cheese ; the rate of advance varies with circumstances, but on the average is about 80 per cent., the balance being transmitted after sale. In calculating this advance, an allowance of 2½ per cent. is deducted from the gross weights marked on the crates in order to arrive at the net weight of their contents.

The importer generally sells to wholesalers and large retailers such as multiple-shop firms ; in some cases, however, transactions may take place between importers, i.e., between merchants and brokers—as, for example, when the purchaser does not wish to reveal his identity or presence on the market. Most importing businesses employ one or two travelling salesmen, but the bulk of the selling is done by letter, telephone and telegraph, or by personal selection by buyers at the importers' premises or adjoining wharves, stores and warehouses. All sales are by private treaty. The general conditions of trade between importer and wholesaler are payment within 30 days, with a discount—of which most buyers take advantage—of 2*d*. per £ for payment within 7 days.

Importers' prices are all landed prices and buyers generally receive one week's free storage from the date of buying—i.e., up to and including 6 days after the date shown on the delivery order. The importer takes no responsibility for the cheese after sale, although he may undertake to carry out buyers' instructions with regard to the removal of the cheese from the wharves or other port warehouses. This is done on the presentation of a delivery order and if any additional charges have been incurred—for extra storage, for example—they are rendered on the carriers' account and the whole paid by the buyer.

The members of the imported cheese trade are represented by the following associations :—

(i) The New Zealand Dairy Produce Importers' Association (24 members).

(ii) The Australian Dairy Produce Importers' Association (18 members).

(iii) The London Provision Importers' Association (60 members).

There is also the Wholesale Produce Merchants' Association (64 members), which represents wholesale merchants (see below).

Each of the associations is a non-trading concern, and exists for the purpose of protecting and promoting the interests of its

members. There is, of course, a certain amount of overlapping in the membership of these associations, as a firm or individual may be a member of more than one. The associations are not exclusively interested in cheese. The London Provision Importers' Association, for example, covers all provisions handled on the London Provision Exchange, but 45 of its 60 members deal in cheese.

(ii) The Wholesaler.

The imported cheese trade is concerned with large consignments transported over long distances, and this necessitates a more intricate marketing organisation than for the home trade. In the home trade, the cheese factor usually specialises in English cheese bought direct from the farm or factory, and, broadly, his functions correspond to those of both the importer and the town wholesaler in the import trade, though a certain amount of home-produced cheese is, in fact, passed from the factor to the wholesaler for distribution to the retailer. The proportion of cheese of English varieties sold by the factor to the wholesaler is, however, small; according to the Linlithgow Committee's Report,* only 10 per cent. of English Cheshire cheese, for example, passes through this channel of distribution.

The town wholesaler, as a type, may be either a primary or a secondary wholesaler. The secondary wholesaler usually operates on a comparatively small scale and acts as a link between the smaller retailers and the primary wholesaler.

Town wholesalers are mainly located in the larger towns and cities; many of the biggest firms maintain a series of branches in the principal towns, notably in the ports, such as London, Liverpool, Bristol, Newcastle and Glasgow. They are usually general provision merchants, handling a wide variety of commodities, the distribution of cheese being carried out with the same machinery as that employed for the other goods handled.

The functions of the town wholesaler are to buy and hold in stock against the needs of his customers—retailers or secondary wholesalers—to select cheese so as to meet their individual requirements and to deliver or dispatch as required. These functions involve the maintenance of a travelling sales staff, the provision of storage accommodation and the advancing of credit to buyers.

Sales by the wholesaler to the retailer are by private treaty on personal inspection or sample, or simply on order by post, telephone or telegraph without previous examination of the cheese by the buyer. The standardised quality of the "Colonial" cheese lends itself to operations of this latter kind. The wholesale trade is conducted on both cash and credit terms, but the generally accepted terms are payment in 28 days with a discount of 2*d.* per £ for payment within 14 days.

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* Cmd. 1854/1923.

(iii) Note on the London Provision Exchange.*

Provision Exchanges play an important part in the wholesale distribution of cheese in this country. The principal Exchanges are at London, Liverpool, Bristol and Glasgow.

The London Provision Exchange originated as the Home and Foreign Produce Exchange, Limited, which was registered as a company in 1887. It was established for the purpose of providing in the City of London an Exchange where produce merchants and others could meet to conduct business in accordance with agreed procedure. The use of the Exchange is limited to shareholders and payers of entrance fees, who, in the case of the cheese trade, consist of importers, wholesalers and large retailers such as multiple-shop firms. Funds are provided by means of shares supplemented by annual subscriptions. The commodities dealt in are pig products, cheese, butter and canned goods. Goods or samples are not, however, exposed on the Exchange itself ; as many buyers wish to see cheese before purchasing, they frequently adjourn to the warehouses or wharves where an inspection may be made. Although a deal may therefore be initiated on the Exchange, it would be safe to say, on the whole, that more transactions are actually completed off than on "the floor."

The main importance of the Exchange so far as the cheese trade is concerned, however, does not lie in its function as a market, but in the formulation of rules† for the regulation and standardisation of trade practices, the provision of arbitration for disputes and the collection and dissemination of business information. Such information deals especially with official landed London prices, which are obtained from the importers who make a return to the Exchange each Friday of the range of prices obtained for English, Scotch, Canadian, New Zealand, Australian and Dutch cheese on the previous day—i.e., Thursday and up to 11.30 o'clock on Friday. A sub-committee reviews these returns and is responsible for the issue of the weekly official market report. The prices published represent actual "spot" transactions for marketable quantities during the period covered by the report.

In the published quotations the following range of types and selections is covered :—

English.	*Scotch.*
Cheddar—Finest Farmers'.	Cheddar—Farmers'.
,, Fine Farmers'.	,, Factory—Coloured.
,, Farmers' Loaf.	,, Factory—White.
Cheshire—Officially Graded.	
,, Ungraded.	
Cheddar—Factory.	
Stilton.	

* *See* Economic Series No. 26, pages 179 and 180.

† The rules are published as a booklet, copies of which are obtainable from the Secretary of the Exchange ; price 3*s*.

Canadian, New Zealand and Australian.	*Dutch* (Edam and Gouda).
Finest Coloured.	Full Cream (45 per cent. and over).
Fine Coloured.	40 per cent. (Factory).
Finest White.	30 per cent. (Factory).
Fine White.	20 per cent. (Factory).

CHAPTER XVI.—THE RETAILER.

(i) Types.

The bulk of the cheese consumed in this country is distributed by retailers of groceries and provisions. Cheese is, in fact, stocked by most of them, and the number handling it has increased since the introduction of processed, non-perishable cheese packed in blocks and portions.

In general, cheese is retailed to the consumer through—

(*a*) The specialist cheese shop.
(*b*) The single-store provision merchant.
(*c*) The single-store grocer and provision merchant.
(*d*) The departmental store.
(*e*) The multiple store, including the retail co-operative society.
(*f*) The dairyman.
(*g*) The marketman.

(*a*) *The Specialist Cheese Shop.*—This is not a common feature of the retail trade. It is run by the cheese factor as a side line to his main business in the town where his warehouse or store is situated ; it thus does not compete with his own retailer customers, since the local retailers seldom buy from factors but obtain their supplies direct from makers. The factor is well placed to conduct a retail trade, as he can offer his particular variety in the widest possible range of qualities and prices. It is only where there is a big local demand, however, that a turnover sufficient to cover the overheads of a shop devoted solely to cheese can be maintained.

(*b*) *The Single-store Provision Merchant.*—The increasing association of the sale of groceries with that of provisions has tended to reduce the number of specialist provision shops. Those which remain depend upon the high quality of their goods to maintain a sufficiently large trade for economical working without the addition of groceries.

(*c*) *The Single-store Grocer and Provision Merchant.*—Cheese is an important standard " line " with retailers of this class, though the attention given to it depends on the class of customer and also, to some degree, on the proprietor's inclination. If the proprietor is an expert judge of cheese, and if his customers appreciate his

ability, it may be made a speciality, otherwise he may be content to stock such standard types and qualities as meet the common demand, making no attempt to stimulate or select for special requirements. With the exception of the various proprietary brands of processed cheese, most of the cheese sold will consist of one or, at most, two varieties. One of the low-priced imported varieties—generally Colonial Cheddar, but in some cases, in the north of England, Dutch Cheshire—will almost certainly be stocked. In addition, the English variety which is most popular in the district may also be sold. If any further varieties are handled, they will usually include Gorgonzola or possibly another English variety. Owing to the localisation of demand, it is not usual for a retailer to stock more than two or three home-produced cheeses. In fact, in some parts of London, for example, English cheese is practically unobtainable from the small retail shops.* Where the retailer handles a wide range of varieties, they usually include such imported cheeses as Edam, Gruyere, Roquefort and Camembert, the demand for which, though limited, is not localised.

Shops with a "high-class" trade meet with a more varied demand for cheese than those with a "working-class" connection. In the latter case, the demand for cheese other than one or two low-priced varieties is generally too small for other kinds of bulk cheese to be stocked without serious risk of loss through deterioration. The "high-class" shops, on the other hand, are able to maintain a sufficient turnover in other varieties to eliminate waste through cheese being a long time moving into consumption. The pre-packed processed cheeses are now sold by the majority of retailers, irrespective of their class of trade.

(*d*) *The Departmental Store.*—The departmental store is characterised by the wide range of goods offered. This is reflected in its cheese trade. The range of customers' requirements is so wide that a large number of varieties of bulk cheese, as well as of brands of processed cheese, must necessarily be stocked. The quality of the bulk cheese stocked by a departmental store depends largely on the skill of the provision buyer.

(*e*) *The Multiple Store.*—Cheese is an important commodity with the larger multiple-shop grocery and provision firms. Their success depends on being able to sell at lower prices than the single-store grocer and provision merchant, by reason of the large scale of their operations and by their better facilities for taking advantage of favourable buying opportunities. The standardised varieties of cheese, such as the "Colonial" Cheddars, are well suited to their trade, which is very large in the popular kinds selling at low prices. Most of the multiple-shop firms in the North do a large trade in English cheese. The ability to buy when the market is low and hold in cold store to await the

* Cmd. 1854/1923, page 69.

season of higher prices gives them a great advantage over the smaller firms who have to buy in relatively small quantities to meet short-period needs. This advantage is especially marked in the north of England with Cheshire cheese, where the range between summer and winter prices is high.

In order to maintain the scale of their purchases, the big multiple stores usually stock only those varieties which are in widespread demand. They do not generally cater for the more localised preferences. In the South and Midlands, imported Cheddar and Gorgonzola cheese, and, in the North, imported Cheddar, English or imported Cheshire, and Gorgonzola are frequently the only bulk cheese handled. Proprietary processed cheeses are also sold.

The more local type of multiple-shop firm, with which may, in general, be included the retail co-operative societies, makes more provision for meeting local preferences. The class of trade carried on by some stores of this type resembles that of the " high-class " single-shop grocer and provision merchant, while others emulate the methods of the national chain stores and stock a few popular varieties at keen prices.

(*f*) *The Dairyman.*—Sales of cheese by dairymen, either in their shops or on their rounds, are chiefly confined to pre-packed cheese. In some towns, soft cheese, often made by dairymen from their surplus milk, is sold in dairy shops or delivered by the roundsmen.

(*g*) *The Marketman.*—The cheese stall (Fig. 40) is a common feature of the weekly retail produce markets and of the daily retail markets that are held under cover in many industrial towns, particularly in the north of England. The cheese stall may be a branch of a local provision merchant's business or may be rented by a specialist cheese retailer who " does the round " of the local markets. Sometimes, cheese-makers themselves also engage in this class of business, but usually only in one market. Several qualities of cheese are generally stocked, with a fairly wide range of price, and it is through the marketmen that much of the inferior cheese is disposed of. As cheapness is the main consideration with the majority of market shoppers, the low-priced, " half-meat," imported varieties sell readily, particularly in winter when the price of English varieties is high.

(ii) Sources of Supply.

Imported cheese is bought by retailers from primary or secondary wholesalers, or even, in the case of the larger firms, direct from the importers.

In the home trade, direct dealings between makers and retailers being relatively unimportant, the main source of supply of cheese to the retail trade is the cheese factor, though a firm of multiple stores, if its cheese turnover is large enough and the requirements of its branches are sufficiently diverse, may employ its own cheese

buyer to buy direct from the makers either at the farms, at the factories, or at the fairs. At the other end of the scale, the smaller grocers may be supplied with cheese by a wholesale provision merchant, the business being too small to interest the factor. The wholesaler may buy direct from the farm, though more commonly he obtains his supplies from a factor. In view of the seasonality of manufacture and of quality of cheese, particularly as regards keeping-quality, the single-store retailers usually buy, in the late summer and autumn, enough cheese to last them through the winter months. Delivery is not often taken at the time of purchase. A frequent arrangement is for the factor to send in the cheese as it is required, consigning only those of level quality and withholding any which have developed defects in storage. A slightly higher price has to be paid for thus declining storage risks, but the practice makes for economy since the factor has better storage facilities and is in a better position than the retailer to dispose of cheese that develop defects. Such an arrangement is seldom possible in buying supplies from the farmer; if the cheese are bought forward, the maker expects them to be accepted.

Some marketmen and some retailers regularly attend the fairs for the purpose of picking up small and uniform lots. The cheese shows are also a source of supply. Prize-winning cheese-makers at the dairy shows are usually able to find retailers who are ready to buy the cheese exhibited; consistent prize-winners may thus build up a direct trade with high-class retail stores. As has been indicated, there is some direct trade between factories and multiple stores. The two requirements of the multiple stores—large consignments and keen prices—can be satisfied by the factories. Where cheapness is the prime consideration, an agreement may be made for the manufacture by the factory of cheese from partly skimmed milk.

(iii) Methods.

It is a difficult matter to make an attractive display of cheese in a retail shop. The exterior of an uncut cheese gives little indication of its quality to the consumer, and when the cheese is cut, the surface tends to dry, discolour and crack, thus detracting from appearance. This makes it necessary to "face up" the cheese from time to time. The facings may be judiciously disposed of by sale to less critical customers, but they generally have to be sold at a loss. To the retailer with a small turnover, this deterioration from exposure is a serious matter.

The cutting-up of cheese for retail sale calls for skill if loss is to be avoided. In this respect, closer-textured cheeses are less wasteful than the crumbly types, such as Lancashire and Cheshire. It is impossible, however, to cut up bulk cheese of any variety into pounds and half pounds so as to make up the same

aggregate weight as that of the original cheese. In practice, loss on this account is generally avoided by taking some latitude in the price charged for the odd ounces and fractions of an ounce. Some retailers meet the objection of the customers to the inclusion of a large proportion of rind in the purchase by selling central cuts, with a minimum of rind, at a slightly increased price per pound. With the Stilton and blue Wensleydale varieties, it is usual to charge a slightly increased price if the cheese is cut at all. In the case of Cheshire and, more particularly, Lancashire cheese, the crumbs and small pieces are sold separately for culinary use at a reduced price per pound. The popularity of the processed block cheese with the small retailer is due to the fact that it can be cut and sold without loss of weight.

CHAPTER XVII.—PUBLICITY.

For cheese, as for other commodities, publicity may be carried out to stimulate or create demand for the commodity in general, or for any particular variety of it, or for the special product of any particular maker, association or country.

(i) Commodity Advertising.

Commodity advertising campaigns on the lines of, for example, the " Eat More Fruit " or " Eat More Fish " campaigns have not, so far, been attempted for cheese in this country. A common feature of this form of advertising is the publication of cooking recipes which involve the use of the product. It is possible that cheese consumption might be stimulated in this way, but an effort of this kind requires for its initiation and financing the existence of comprehensive associations of producers of the commodity concerned, while in view of the fact that all suppliers of the market would benefit from the stimulation of demand,i mporters should, in equity, collaborate.

The advertising of a particular variety of cheese is more limited in scope, but here, again, some representative commodity organisation of producers is required. Individuals or groups of individuals are unlikely to initiate and finance publicity of this type since any demand-stimulation which may result would be shared by all the producers of the variety concerned. An example of variety advertising by an organisation of producers is provided by the recent convention of Roquefort cheese makers in France, one of the objects of which is to stimulate the export of that variety by intensive advertising in foreign countries. The project in this case is facilitated by the fact that the ripening of Roquefort cheese is in the hands of a small number of firms. Similar action might be

taken by the makers of certain kinds of cheese in this country, particularly Stilton cheese. This variety, like Roquefort, is produced by a comparatively few units and meets a luxury demand which might be extended here and possibly abroad by effective publicity.*

(ii) Brand Advertising.

Special publicity for the product of any individual maker, association or country is based on the marking of the commodity with a brand or a trade-mark and on the maintenance of continuous supplies of reliable quality. Such forms of publicity as posters, newspaper advertisements and shop-display material are employed for this purpose and directed primarily to the consumer. This type of advertising, as applied to distinct brands of a commodity, is only fully effective if the brand-name or trade-mark is always discernible on the article as bought by the consumer. This is feasible for the pre-packed processed and cream cheeses of proprietary brands, but, for most kinds of bulk cheese, no completely satisfactory method of accomplishing this has yet been devised (see Chapter X.).

Nevertheless, for bulk cheese, proprietary brands lend themselves to propaganda among retailers, and this, by itself, is an important factor in demand-creation. Publicity directed to the retailer may take the form of advertisement in trade papers, but its most effective form is personal propaganda by the wholesale distributor and his salesmen.

Although publicity aimed at the consumer is only fully effective if a mark of identification appears on the article or portion bought, the stimulation of consumer-demand for a special brand or grade of goods is possible, in some degree, even where the consumer does not see a mark of identification. Thus, Canterbury lamb is extensively advertised and is habitually asked for by consumers, although it bears no mark by which the consumer can identify it. The essential to publicity in cases of this kind is reliance by the consumer on the retailer to supply the genuine article.

It is knowledge of this fact which prompts the New Zealand and Australian Control Boards, for example, to push the sale of the dairy produce, both butter and cheese, of their respective countries by posters (Fig. 41), newspaper advertisements and shop-display material, directed to the consumer in this country, as well as, of course, by efforts of various kinds directed primarily to the retailer. Similarly, both the Cheshire and Cheddar Cheese Federations carry out a certain amount of publicity for their trade-marked cheese by the issue of shop-display material, and by exhibits at popular shows, while appealing to the retailer by advertisements in trade periodicals as well as by exhibits at agricul-

* *See* Economic Series No. 1, pages 45–6.

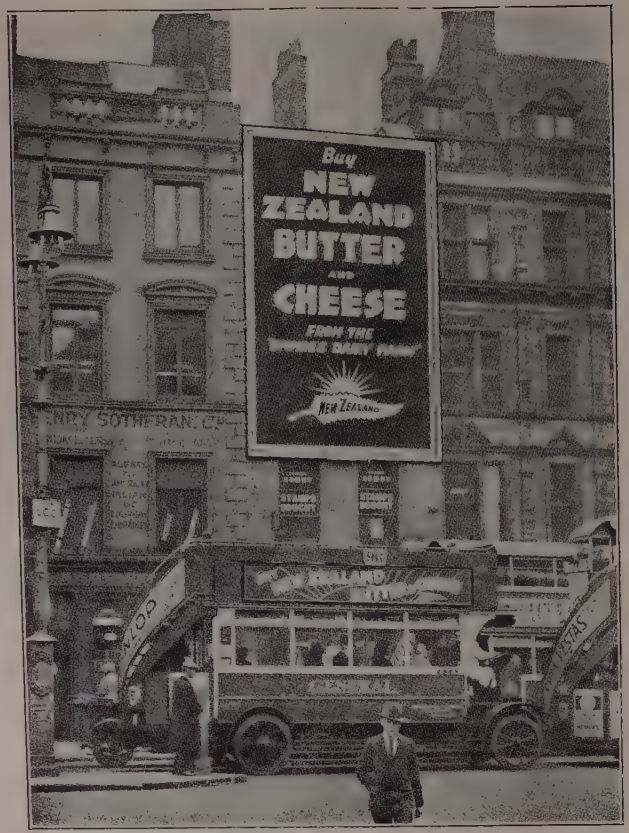

FIG. 41.—New Zealand dairy produce advertisements.

FIG. 42.—Trade Exhibition publicity.

[*Facing page* 118.

FIG. 43.

FIG. 44.—Unloading Canadian cheese at Surrey Commercial Docks, London.

tural shows and other trade exhibitions (Fig. 42). The Empire Marketing Board's "background" advertising in favour of Empire products—many of which bear no means of identification on sale to the consumer—is also based on the same theory that retailers, in the mass, can be relied on to supply the article demanded by the public.

It follows that the grading and marking of home-produced cheese with the National Mark would similarly afford a basis for publicity directed to the consumer as well as to the retailer. Indeed, under the suggested National Mark scheme (pages 81-84), it is contemplated that each bulk cheese would bear the Mark once on the rind, so that, unlike much of the bulk cheese now being advertised, the genuineness of National Mark cheese could usually be confirmed in the shop before purchase if the housewife were disposed to do so. Given a National Mark scheme for home-produced cheese, the comprehensive organisation of cheese producers would be more than ever desirable in order to supplement, by adequate and sustained publicity for their own product, the publicity which is already accorded to the National Mark.

(iii) Note on Descriptions.

By reason of the reputation for quality which the makers have built up, the names of many varieties of cheese have a considerable goodwill value. It is not surprising, therefore, that, in a number of cases, cheese-makers have laid themselves out to produce an imitation of some widely known variety, normally produced in another country, in order to exploit its commercial reputation. Where the imitation is made from inferior milk, with only moderate skill or at a season when the original is not available, its sale under the varietal name, without any indication as to the country of manufacture, is calculated to prejudice the sale of the true variety. Thus, Roquefort cheese, which properly is made in the Roquefort district in France, from sheep's milk by a specialised process, meets with competition in its export markets from inferior cheese made in other countries from cow's milk and sold as Roquefort.

Until recently, the makers of varieties subject to competition of this nature failed to realise the damage which threatened their market, and in consequence the names of many varieties have come to signify the process by which the cheese is made, rather than the district of manufacture. An International Cheese Committee was, however, set up in 1924, by the International Dairy Federation, for the purpose of securing agreement with regard to cheese nomenclature in all countries. The countries represented on the Committee are, Great Britain, Belgium, Canada, Czecho-Slovakia, Denmark, Finland, France, Germany, Hungary, Italy, Japan, the Netherlands, Norway, Spain, Sweden and Switzerland. The Committee has put forward certain suggestions for consideration

as a basis for legislation by the Governments of all countries exporting or importing cheese. The main principles embodied in these suggestions are (1) that whether in domestic or export trade, the sale of cheese under a name derived from the place of origin of the variety concerned, or under the name of a variety which has established for itself an international reputation, should not be permitted, except in the case of cheese made in the country of origin of the variety concerned, without some clear indication of the country of manufacture of the cheese, and (2) that the sale of cheese under the name of any variety should not be permitted unless the cheese is made from raw material of the same nature as that normally used in the manufacture of the variety.

The acceptance of these suggestions would entail the promulgation of regulations by cheese importing countries for the purpose of protecting the cheese industry of exporting countries. So far, few countries have taken steps to put the proposals of the Committee into effect.*

In the case of this country, Section 1 of the Merchandise Marks Act, 1926, gives protection to English cheese sold under English " place " names on the home market ; and, as the varietal names for English cheeses are " place " names, it protects these. Under this Act, British " place " names must not be used to describe imported cheese unless an indication of origin is applied, which may be either " Empire " or " Foreign," as the case may require, or alternatively, a definite indication of the country of manufacture or production. It appears to be doubtful if English "Varietal " names can be legally used to describe cheese made from milk inferior to that customarily used in the manufacture of recognised English " varietal " or " place " named cheese. Thus, the legality of selling, for example, Dutch Cheshire type cheese made from partly skimmed milk as " Cheshire " cheese, even though qualified by the word " Dutch," is questionable.

The cheese industry of Great Britain is not, at present, concerned with the acceptance of the Committee's suggestions in foreign countries, since it so happens that such varieties of cheese as are exported from Great Britain meet with little competition from imitations.

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* By a recent agreement between Switzerland and France, French cheese of the Gruyere type will be known in future as " French Gruyere " or " Gruyere from the French Jura."

PART V.—TRANSPORTATION.

CHAPTER XVIII.

(i) Sea.

(*a*) *Ports of Entry.*—The imports of cheese into the principal ports in Great Britain from 1925 to 1929, and the percentage of the total average annual imports received at each port are shown in Table VIII, page 151. Over 70 per cent. of the total imports pass through London and, apart from Liverpool, Bristol and Glasgow, which handle some 6 per cent., 5 per cent. and 3½ per cent. respectively, no other port in Great Britain accounts for more than 3 per cent. of the total imports. The distribution of the bulk of imported cheese within the country thus radiates from one principal point, namely, London.

The other ports, with the exception of Folkestone and Harwich, are chiefly concerned with supplying more or less local requirements. Liverpool and Manchester supply the Lancashire industrial areas and to a less extent the West Riding of Yorkshire and the Midlands. Bristol, besides supplementing Cardiff as a source of supplies for the South Wales area, sends also to the Midlands and to the south-west of England as far east as Berkshire. Newcastle and Hull together serve the north-eastern counties of Northumberland, Durham and the East Riding of Yorkshire. Folkestone and Harwich, on the other hand, handle a specialised trade. Folkestone receives considerable quantities of French soft cheese and of Italian cheese, dispatched overland through France; it is, in fact, the principal port in Great Britain receiving Italian cheese. Harwich, as the terminus of the Continental train-ferry service, also receives large quantities of Italian cheese for conveyance to London. Harwich ranks third after Folkestone and London as a port of entry for Italian cheese.

(*b*) *Services.*—The traffic in Canadian and New Zealand cheese is mostly in the hands of a small number of shipping companies. The vessels employed are those of the general cargo class carrying mixed cargoes, consisting largely of bacon and cheese in the Canadian trade, of meat and dairy produce from New Zealand. The principal loading port in Canada is Montreal. In New Zealand, a number of ports, of which the most important are Auckland and Wellington in the North Island, and Dunedin, Inver

cargill and Littleton in the South Island, are available at which the vessels call, in turn, and thus make up a complete cargo.

Regular ocean services are maintained, but, as imports from Canada and New Zealand are distinctly seasonal, the size of cheese shipments varies at different times of the year. Shipments of New Zealand cheese are mainly forwarded in the first instance to London, which receives roughly 90 per cent. of these imports, the remainder being conveyed to the west-coast ports of Avonmouth, Liverpool and Glasgow. While London is also the principal port receiving Canadian cheese, its significance, in this respect, is less; other ports to which direct shipments from Canada are consigned include Avonmouth, Liverpool, Manchester and Glasgow.

The times occupied on the journeys vary according to the route followed and the type of vessel employed. On the average, transport from Canada occupies from 9 to 12 days, and that from New Zealand from 35 to 40 days. In the latter case, the principal route is via Panama, but a few steamers also travel via Cape Horn.

Cool-air storage, during the voyage, is usual for New Zealand cheese, the temperature of the holds being maintained at from 45 to 50 deg. F. Only a proportion of Canadian cheese, however, is carried under cool-air conditions, the temperatures maintained being slightly lower than for New Zealand cheese. In the case of one important line, the proportion of Canadian cheese carried under cool-air conditions is in the neighbourhood of 20 per cent.

In London, Canadian vessels discharge at the Surrey Commercial Docks (Figs. 43 and 44), and the cheese is conveyed directly into the sorting chamber of the Port of London Authority's warehouses, where, on the merchant's specification, it is sorted by the staff according to marks, grades and colours, weighed nett for average loss and then allocated to the storing chamber, which is under a controlled temperature normally ranging from 50 to 55 deg. F.

Vessels with New Zealand cheese discharge their cargoes, in the Royal Albert and Victoria Docks, overside into barges, in which the cheese is lightered up the Thames, mainly to various private wharves and warehouses, and also, to a less extent, to the Port of London Authority's premises at the Surrey Commercial Docks. In winter, uninsulated, and in summer, insulated, barges are used. The average capacity of the latter is 1,200 crates, the maximum capacity of barges of this type being 1,400 crates. Uninsulated barges are somewhat larger with a capacity of from 1,800 to 2,000 crates. The labour employed in the barges is that of the barge companies; on board the ocean-going vessels, the labour consists of stevedores employed by the shipping companies. The cheese is unloaded from the barges by means of cranes, and is sorted, weighed and placed in store in the same way as Canadian cheese.

(c) *Rates.*—The freight rates for cheese shipped to this country from various sources are as follows :—

	Per lb.
New Zealand cheese	$\frac{7}{8}d.$*
Australian cheese	$\frac{7}{8}d.$
Canadian cheese :	
In ordinary storage	$\frac{1}{2}d.$
In cool-air storage	$\frac{2}{5}d.$
Dutch cheese :	
Harlingen to London	
Goudas (loose)..	$\frac{1}{5}d.$
Edams (in cartons)	$\frac{1}{6}d.$

Other charges incidental to the transport of imported cheese include port rates, storage rates and operative charges. Examples of these charges, which are not constant in every case, are given on pages 136 to 138 for a number of ports.

(ii) Rail.

(a) *Facilities.*—Cheese is mainly conveyed by merchandise train in covered wagons, but the passenger service is also used, to some extent, for the carriage of small speciality cheese packed in wooden or cardboard boxes, for perishable soft cheese packed in returnable wooden boxes and for single or half Stilton, Wensleydale and truckle Cheddar cheese in hampers or boxes. Although boxing and crating of cheese are practised, particularly in the case of small consignments, the only packing material used for most of the home-produced hard-pressed cheese is a layer of loose straw on the bottom of the truck (Fig. 45) and between the tiers of cheese. If very firm, the cheese may be stacked on top of one another in three tiers with layers of straw between, but softer and more easily damaged cheese are stacked only two high or even in a single layer. Considerable cubic space is thus wasted which could be saved by the provision of shelves, but the receipts from cheese traffic apparently do not justify the railway companies in equipping wagons specially for the purpose. No additional charge over the ordinary rates is made for cheese which cannot be stacked. The bulk of imported cheese—Canadian and New Zealand—is carried over the railways in boxes or crates containing one or two cheese respectively, and these can be stacked in the wagons without risk of damage to the contents.

In the Netherlands and Italy, the regularity and size of the consignments, and in the latter country, the perishable nature of the cheese, have led to the provision of special facilities. In the Netherlands, railway wagons are fitted with movable shelves so that large

* Less 15 per cent. on the net weight.

quantities of comparatively small cheeses can be loaded without any protective packing. In Italy, a special fast rail service from the maturing districts to the Continental port of shipment is provided for Gorgonzola and other soft cheese exported to the United Kingdom. In hot weather, refrigerated vans are provided. The wagons for the transportation of these cheese are not fitted with shelves, as the fragility of cheese of these varieties makes it essential to pack them in baskets which can be stacked upon one another.

No special conditions attach to the conveyance of cheese by rail in this country except that soft cheese, transported unpacked, is only accepted as " damageable goods not properly protected by packing." The risk of damage to unpacked cheese of all kinds arises chiefly in the handling and it is, therefore, important that consignments should be sufficiently large to justify the allotment of whole wagons to this one commodity. The farmer does not generally produce sufficiently large individual consignments for this purpose, and, in consequence, road transport is more frequently used for conveying his cheese to assembly points. Factors, on the other hand, are often able, collectively if not individually, to make up sufficiently large loads for the conveyance of cheese both from the fairs to their warehouses and from their warehouses to the consuming centres in truck loads. They are, therefore, large users of rail transport. In the movement of imported cheese within this country, rail transport is used to a greater extent than road transport. Consignments are large, the cheese is packed to withstand handling, and the average length of haul is greater than in the case of home-produced cheese ; some two-thirds of the cheese arrives in London, whence it has to be distributed over a wide area.

(*b*) *Goods Train Rates.*—The rates for cheese carried in merchandise trains vary according to the packing, cheese in casks, cases or crates falling in Class 14* of the General Railway Classification, in hampers in Class 15†, and all other cheese in Class 18. Exceptional rates for cheese are available where consignments are regular and in sufficient quantity. Appendix B gives examples of standard and exceptional rates prevailing between certain points.

As a general rule, cheese packed in casks, cases, crates or hampers is accepted at Company's risk. Collection and delivery charges, where these services are performed by the companies, are additional, except in the case of exceptional rates, which are in-

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* Except where exceptional rates for Cheese, Class 14, Groceries List " H " or Provisions are in operation.

† Except where exceptional rates for Cheese, Class 15 or Groceries List " H " are in operation.

clusive. Within the recognised cartage boundaries, the following are examples of charges made for collection and delivery :—

In the Provinces	2*s.*	6*d.*	per ton for each service.
In London	6*s.*	8*d.*	„ „ „ „

Small parcels of under 3 cwt. (other than returned empties) for transit by merchandise train are accepted on a scale of charges specially adopted for such consignments ; this scale is applied to either standard or exceptional rates and is based on the quantum of the rates applicable with the following additions :—

Per Ton.	*Additional Charge per Consignment.*
On rates not exceeding 10*s.*	4*d.*
„ „ „ 20*s.*	5*d.*
„ „ „ 30*s.*	6*d.*
„ „ „ 50*s.*	7*d.*
„ „ „ 70*s.*	8*d.*
„ „ „ 100*s.*	9*d.*
Exceeding 100*s.*	10*d.*

Fractions of 14 lb. are charged as 14 lb.

Cartage at 1*d.* per consignment at each end is also added to the scale. When this scale is applied to rates excluding cartage or including cartage at one end only, 2*d.* per consignment or 1*d.* per consignment, as the case may be, is deducted from the scale charge.

The carriage of returned empties, which is not, however, of great significance in cheese traffic, is provided for on merchandise trains under the following scale :—

All Returned Empties not comprised in any of the other classes of Returned Empties.	Per cwt.
	s. *d.*
Not exceeding 25 miles	0 3
Exceeding 25, but not exceeding 50 miles	0 6
„ 50 „ „ 100 „	1 0
„ 100 „ „ 150 „	1 5
„ 150 „ „ 200 „	1 10
„ 200 „ „ 250 „	2 3
„ 250 „ „ 300 „	2 8
„ 300 „ „ 350 „	3 1
„ 350 „ „ 400 „	3 6
„ 400 „ „ 450 „	3 11
„ 450 „ „ 500 „	4 4
„ 500 „ „ 550 „	4 9
„ 550 „ „ 600 „	5 2
„ 600 miles	5 7
Minimum charge	0 4

(c) *Passenger Train Rates.*—The following are specimen rates for transport by passenger train between certain points :—

	Standard (Company's Risk).		*Exceptional (Owner's Risk).*	
	Per Cwt.	Minimum Consignment.	Per Cwt.	Minimum Consignment.
	s. d.	Cwt.	*s. d.*	Cwt.
Castle Cary to London ...	5 5	1	4 8	1
Trowbridge to London ...	4 11	1	3 11 3 6	½ 1
Trowbridge to Birmingham	5 6	1	—	
Highbridge to Cardiff ...	4 2	1	4 3 3 11 3 6 3 2	½ 1 5 10
Whitchurch (Salop) to Manchester	3 3	1	—	
Whitchurch (Salop) to Leeds	4 5	1	—	
Whitchurch (Salop) to London	6 9	1	—	

Rates for conveyance by passenger train are differentiated according to whether risk is accepted by company or owners. In the former case, two rates are in operation, the standard rate for quantities of 1 cwt. and upwards, and the General Parcels Scale for lesser quantities. For carriage at owner's risk, quantities of ½ cwt. and upwards are carried at "exceptional" per cwt. rates, while parcels of cheese from 12 to 56 lb. are carried at the rates applying in the "S" scale. Quantities below 12 lb. are provided for under the Exceptional Owner's Risk Parcels Scale. The Standard and Exceptional per cwt. rates are station to station, while the services attaching to the General Parcels Scale are collection and delivery and to the Exceptional Owner's Risk and the T S" scale, delivery only. Examples of the above scales are given welow for three different selected weights :—

Distance. (Miles).	*Standard Parcels Scale.*	*Exceptional, Owner's Risk Scale.*	*"S" Scale.*
		10 *lb.*	
76–100	1*s.* 5*d.*	1*s.* 0*d.*	—
		28 *lb.*	
76–100	2*s.* 10*d.*	1*s.* 11*d.*	1*s.* 7*d.*
		56 *lb.*	
76–100	4*s.* 11*d.*	3*s.* 3*d.*	2*s.* 8*d.*

Cheese dispatched by passenger train is rarely sent unpacked and the rates for returnable empty packages vary from :—

8*d.* for 15 miles for 14 lb. to
4*s.* 0*d.* for over 300 miles for 112 lb.

The usual handling facilities given to passenger train traffic are available. Charges for collection and delivery, where additional, are generally :—

In London	... ...	6*d.* per cwt. with a minimum of	4*d.*
In the Provinces	... ...	4*d.* „ „ „ „	3*d.*

(iii) C.O.D. Services.

The cash-on-delivery system is available for cheese for Parcel Post service ; the cheese must not exceed 11 lb. in weight when packed. The recently introduced combined Post Office and Railway Service is available for consignments of produce of any weight not liable to rapid deterioration, and either passenger or goods train may be used ; highly perishable produce must not exceed 2 cwt., and only passenger train services are permitted.

Apart from postage, the fees charged for the Parcel Post service are based on the amount to be collected, viz. :—on 10*s.* value the fee is 4*d.* ; on £1, 6*d.* ; on £2, 8*d.* ; on £5, 10*d.*, and thereafter 2*d.* for each additional £5 or portion of £5 up to £40. When using the combined service, the consignor pays a special railway consignment fee of 3*d.*, the cash-on-delivery fee, postage and registration of the covering letters (4½*d.*) and also the rail-conveyance charge, based on the weight of the package and the service employed. For the Parcel Post service, the smaller truckle shapes of the hard cheeses fall below the maximum weight prescribed. Of the soft cheeses, the cream cheeses, with relatively high value in proportion to their weight, are best able to bear the cost of this method of distribution, though other cheeses, such as Coulommier and Pont l'Evêque, benefit by direct dispatch from the maker to the consumer. For packing the small, soft cheeses, light wooden or cardboard boxes or special chip boxes have been designed. The hard cheeses are amply protected by wrapping in canvas and an outer covering of brown paper, but half-Stiltons and half-Wensleydales need the extra protection of a box or basket.

(iv) Road.

(*a*) *Extent.*—The reduction in terminal handling afforded by road transport, and the general development of motor haulage facilities for all forms of produce within recent years, have led to a considerable growth in the use of road transport, particularly by cheese factors for collecting and dispatching home supplies, and by importers and wholesalers for consigning imported supplies moderate distances.

In the case of home supplies, road transport is utilised, on the largest scale, for the transport of cheese from the makers' premises to the cheese fairs and to the factors' warehouses. Road transport is used, particularly in the areas of more concentrated cheese production, where the quantities regularly available are sufficient

for full lorry loads to be made up from single farms, or from a few farms sufficiently near together to enable regular collection rounds to be established. The use of road transport for imported cheese is mainly confined to wholesalers, who employ this method largely for supplying their retail customers within a distance of about 50 miles. To some extent, road transport is also used by wholesalers for longer distances, as, for example, between London and Birmingham and between London and Bristol and other towns in the south of England ; this means of transport, however, is rarely used for distances of over 100 miles.

(*b*) *Organisation.*—Both cheese-makers' and factors' vehicles, as well as hired transport, are used in the movement of cheese from farms and to and from fairs (Fig. 46). Horse-drawn transport has been largely superseded by motor vehicles, but it is still used, particularly by farmers, in conveying cheese to the fair or the factor's warehouse. This short-range traffic in the producing areas has been greatly facilitated by the increased use of light motor-lorries by farmers. Transport of cheese from the fairs is the responsibility of the buyers, who arrange for delivery, either by road or by rail, generally to their own warehouses. The factor may run his own motor-lorries or rely wholly or in part on hired road transport or on rail transport. Quantities purchased at the fairs by a single factor are large and it may not be economical for the factor permanently to maintain sufficient vehicles to transport the occasional large loads.

In some of the less important cheese-making districts, the factors and, in some cases, the makers, carry cheese, at regular and frequent intervals, in their own motor-lorries or vans direct from the producing district to consuming centres within a distance of 50 miles for distribution direct to retailers. This method of distribution is common with Cambridge cheese made in the Isle of Ely, where it appears to be a development of the former practice of delivery with horse-drawn vehicles direct to the consumer by makers or hucksters.

The transport of cheese by road-haulage contractors is common in the north-western and south-western cheese-making areas, especially for long distances. To such an extent has this practice grown that, in the Cheshire cheese-making district, for example, specialist haulage businesses have developed solely for the transport of cheese, the lorries being specially equipped for the purpose. Cheese haulage contractors in this area arrange regular collection journeys, the dates of which are notified to the factors, who give particulars of the farms to be called at on the route and the quantity of cheese ready at each. This enables full loads to be carried, provides regular employment for staff and lorries and thus enables the carrying charges to be reduced to a level only slightly higher than that of rail charges.

Fig. 45.—Transport of Caerphilly cheese by rail.

Fig. 46.—Transport of Caerphilly cheese by road.

FIG. 47.

FIG. 48.—Two-decker lorries for the transport of Cheshire cheese.

Apart from the regular collecting rounds of this type, which are more prominent in the Cheshire cheese district than in other parts of the country, special journeys of collection may be arranged by the factor with the contractor, when cheese is available in sufficient quantity at any one farm or from a group of farms in close proximity to one another.

(*c*) *Equipment.*—Motor lorries which are regularly used for the transport of cheese are usually fitted to take one or two additional floors constructed of movable boards, so that cheese may be loaded loose in several layers without damage to the bottom layer (Figs. 47 and 48). The cheese when loaded are covered with a tarpaulin, since built-on covers interfere with the loading operations. Lorries specially equipped for cheese transport vary in capacity from one to four tons.

(*d*) *Economy.*—Owing to varying conditions, there are, of course, no standard rates for road transport, and it is, therefore, impossible in any general way to compare the costs to users of road and rail transport respectively. Where the farmer or factor uses his own vehicle, it is a question of working costs rather than of charges; in the former case, it may be a matter of providing work for farm vehicles when they would otherwise be idle. In the case of hired transport, the rates charged are largely a matter of individual agreement. Thus, the rates charged by two independent contractors for road transport between London and Bristol are respectively 25*s.* and 26*s.* 6*d.* per ton from door to door.

In comparing the respective economy of road and rail transport, other factors, in addition to costs, must be taken into account, including, in the case of road transport, the convenience of door-to-door delivery and the elimination of intermediate handling. In the Cheshire cheese district, for example, though road transport rates are on the whole slightly higher than those for the same distances by rail, the popularity of road transport is on the increase.

The transport of cheese may be divided into three zones:—(1) up to 50 miles, (2) between 50 and 100 miles, and (3) over 100 miles. In the first, the convenience and flexibility of road transport makes the road vehicle a serious competitor of the railways; in the second, road transport still competes with the railways, but to a less extent, and where it is used, lower charges are generally the attraction; in the third zone the railways are still, for the most part, unopposed.

PART VI.—STORAGE.

CHAPTER XIX.

(i) General.

With most varieties, the storage of cheese for ripening purposes is an essential part of the production process. Apart from this, however, the storage of cheese for considerable periods is necessitated by the seasonality of manufacture.

The storage of home-produced varieties of cheese is undertaken partly by the producer and partly by the cheese factor. Storage accommodation for imported supplies is provided by, or on behalf of, the importer and wholesaler. Beyond holding stocks in sufficient quantity and variety to meet short-period needs, the retailer does not, as a rule, store cheese ; in this respect, the practice of the retail trade has changed in recent years.

(ii) Duration.

In this country, the old custom of storing cheese for very long periods is now out of date. The trade to-day regards any superiority of quality that may result from extended ripening as being insufficient to compensate for the long immobilisation of capital involved, particularly in view of the widespread demand for a low-priced cheese. Moreover, consumers at the present day generally prefer a milder, less mature cheese than formerly, and the demand for very old cheese is relatively insignificant. Consequently, unlike some foreign varieties, nearly all English varieties of cheese are consumed within twelve months of manufacture.

The period of storage differs with the variety and the season of manufacture. The normal storage periods of the principal varieties have been indicated (Chapter I). With a variety, such as Caerphilly, which is eaten unripened, storage accommodation, when required, is merely for the holding of current stocks by distributors. As soon as Caerphilly cheese is fit for transportation, it is moved as quickly as possible to the retailers for immediate sale. This is also largely the case, at certain seasons, with the Cheshire, Stilton and Wensleydale varieties which, in the spring and early summer, are now chiefly sold immature. Stilton cheese, however, in June, and Cheshire in July, begin to be held back for maturing, the former mainly for sale at Christmas and the latter for sale in the late summer and autumn. Wensleydales, for the most part, continue to be sold fresh throughout the manufacturing season, but a small proportion are retained for " blueing " from July onwards.

In the case of those varieties which normally undergo ripening, the cheese made earliest in the year are considered unsuitable for

long keeping and are consumed between June and September, the storage period seldom exceeding two months. Of all matured varieties, the cheese made in the late summer and early autumn are customarily stored for the longest periods. September-made cheese of both Cheddar and Cheshire varieties may be held for sale as far on as the following summer. By the end of March, however, stocks of cheese are usually much depleted. The storage of home-produced cheese thus assumes most importance in the second half of the year.

(iii) Shrinkage in Store.

Loss of weight, either through the exudation or the evaporation of moisture, is inevitable with all varieties of cheese even after the actual process of manufacture is completed. The higher the moisture-content of the cheese, the greater the tendency to lose weight in store. Over a given storage period, the loss is, therefore, likely to be greater with the soft cheeses than with the hard varieties. In practice, however, the soft cheeses are eaten fresh, before much loss of weight can take place.

The rate of evaporation of moisture from cheese is determined mainly by the temperature and humidity of the atmosphere and the texture and size of the cheese. A high storage temperature not only accelerates evaporation but also causes the running of butter-fat from the cheese to the serious detriment of its quality. Evaporation is also accelerated by a dry atmosphere ; excessive humidity in the cheese-store, however, results in heavy external mould growth and faulty ripening. Cheeses of open texture tend to lose weight in store to a greater extent than those of close texture. Thus, evaporation is greater with Cheshire cheese than with Cheddar. Shrinkage in store is generally greater in the smaller cheeses owing to their relatively greater surface area. It has been suggested that to meet the competition of processed cheese sold in small portions, bulk cheese should be manufactured in small weights suitable for direct sale to the consumer. Apart from the extra labour entailed, excessive shrinkage through evaporation discourages the manufacture of small-weight, hard-pressed cheese on any extensive scale.

It is obviously impossible to generalise as to the rate of shrinkage in different varieties of cheese, but the normal loss in weight of mature cheese in store is generally accepted as being 1 per cent. per month in the case of Cheddar and up to 2 per cent. per month in the case of Cheshire. For freshly made cheese, the rate of shrinkage is much greater. Cheshire cheese, for example, may be expected to lose about 6 per cent. and white Stilton and Wensleydale 20 per cent. of their weight in the first two months after making. September-made cheese of the hard varieties shrink less in storage than those made earlier in the year, a fact which is only partly due to the lower temperatures ruling when they are in store.

The tendency of the cheese-maker, to-day, is to sell his cheese early and thus transfer to the factor the loss of weight which takes place in store, as well as the risks of deterioration. The sale of cheese very fresh and containing a high percentage of moisture is particularly a feature of the Cheshire cheese industry in spring ; the practice, as has been indicated, is partly responsible for the low prices which prevail for that variety at that season. Naturally, buyers of freshly made cheese of this type make a liberal allowance in price to cover subsequent shrinkage in store. Those varieties which lose least in weight during storage tend to be the most popular both with the trade and the consumer. The popularity of imported Cheddar cheese in the trade is, to some extent, attributable to the relatively small loss in weight that occurs. The same is true of the demand for processed cheese, in which the loss of weight is negligible.

Before the War, it was the common practice, at any rate with Cheshire cheese, for the producer to make the buyer an allowance of 1 lb. per cwt. to cover loss in weight due to normal evaporation and shrinkage after the cheese left the farm. This custom however was given up in 1920.*

(iv) Requirements.

The conditions under which cheese is stored differ according to the variety. Certain essential conditions, however, are common to all varieties. For example, draughts and sudden changes in temperature or humidity are detrimental. Of the home-produced varieties, the Stilton and the Wensleydale are the most susceptible to adverse influences of this nature, and for cheese of these varieties some means of heating the store in winter is necessary in order to preserve an equable temperature. Similarly, in the summer, it is an advantage to keep down the temperature either by refrigeration, or, as is sometimes the case, by the store being constructed below ground level. It is a further advantage, especially for these varieties, if the store can be made airtight so that fumigation may be carried out for the destruction of mites and other parasites. There should be sufficient space in the store to enable the cheese to be turned regularly ; this is necessary to ensure uniform moisture distribution in the cheese, as well as to permit the free circulation of air round each cheese which is essential for the formation of rind and for proper ripening. Where floor space is abundant, the cheese may be laid on the floor at most two deep (Fig. 49) ; if the floor is of brick or of stone, the cheese should be laid on straw ; if of wood, no special protection is necessary. To economise space, many stores are equipped with wooden racks or shelves on which the cheese are placed in single layers (Fig. 50). The shelves themselves are sometimes adjustable so as to accommodate cheese of different sizes. Cheese of British varieties are placed on the shelves resting

* Cmd. 1854/1923, page 71.

FIG. 49.

FIG. 50.—Interiors of stores for English cheese.

FIG. 51.—Sbrinz cheese arranged vertically in racks. (Italy.)

FIG. 52.—Interior of cool-store. (England.)

on their flat surfaces; the Sbrinz cheese of Italy is placed on edge in the racks when sufficiently hard to keep shape in that position (Fig. 51); Provoloni cheese are suspended in pairs, straddle fashion, by plaited ropes hung over poles.

Rotating racks or frames are often used which can be moved, at intervals, through half a revolution, thus obviating the necessity for turning each cheese singly.

(v) Storage of Home-produced Cheese.

As previously stated, the storage of home-produced cheese is carried out by both makers and factors. The extent to which cheese-makers store their own cheese is determined by the adequacy of their storage facilities and their eagerness or otherwise to realise on their product. For various reasons, such as lack of capital, lack of storage space and the desire to sell before prices fall to their summer minimum, makers generally dispose of their cheese more quickly at the beginning of the manufacturing season than in the autumn.

Farm cheese-stores are generally less satisfactory than those of factors. The factor handles a large volume of cheese, and storage, with him, is a specialised business, his warehouse being often specially constructed and equipped for storage purposes. The farm cheese-store, on the other hand, is in many cases an improvised building; unsuitable or inadequate storage accommodation is a common handicap of cheese-making farmers, particularly those whose farmsteads were not designed for cheese making.

For both economic and technical reasons, it is desirable that the maker should be in a position to store his own cheese until the maturing is fairly advanced. The farmer who is forced to dispose of his cheese rapidly, either through lack of storage space or for financial reasons, is obviously in a weak bargaining position. The storage of cheese on the farm enables the producer to test for himself the kind of product he is turning out and to observe the effect on quality of any improvements he may make in his methods of manufacture. As he has to bear any losses that may occur through the development of faults in store, he is stimulated to improve his manufacturing technique so as to reduce such losses to the minimum. Cheese which undergoes a ripening process of some months' duration is, in fact, commonly stored by the maker during the critical early part of the ripening period. It is especially to the advantage of the maker of high-quality cheese to store his own product until fully matured; the buyer of immature cheese must make some allowance for the risk of defects arising in store, but if the cheese is fully ripened it is bought on its intrinsic merits and is more likely, on that account, to realise its true value.

In some instances, cheese is retained in the maker's store after sale, on condition that any cheese developing defects before

delivery will be replaced by the maker. This practice is most common in the case of sale direct to the retailer. It is a recognised feature of the Stilton cheese trade ; with this variety, retailers are anxious to make sure of their Christmas supplies and, therefore, buy well in advance, and, if they themselves have not the requisite storage accommodation, they will leave the cheese, until required, at the factory store. With Cheddar cheese, a similar arrangement is often made between the retailer and the cheese factor.

(vi) Warehousing of Imported Cheese.

Cheese-storage accommodation on a large scale is found at the principal ports such as London, Liverpool and Manchester. In London, extensive cheese-storage accommodation is provided in the numerous privately owned wharves and warehouses in the vicinity of Tooley Street and London Bridge ; storage space is also provided by the Port of London Authority at the Surrey Commercial Docks. In view of the large proportion of imported cheese landed in London, the facilities offered by the Port of London Authority merit a brief reference.

The functions of the Port of London Authority in relation to incoming merchandise are as follows :—It is a custodian only, and in addition to the ordinary labour for receiving and handling goods ex-ship, it has a staff of experts who perform such operations as the owners of the goods may direct. It houses the produce discharged from the vessels and reports upon its weight, quality and condition to the merchants interested, sorts it to quality and to marks, opens packages containing such goods as are sold by inspection of the whole package, and furnishes samples which represent the exact condition of the produce. These samples are sent for exhibition to the London sale-rooms, where they are inspected by intending buyers.*

The principal cheese warehouses owned by the Port of London Authority are situated at the Surrey Commercial Docks. They are used for both cheese and bacon and consist of two blocks of premises, the Western and the Eastern Warehouses, their combined capacity being in the neighbourhood of 2 million cubic feet.

The Authority is mainly concerned with Canadian and New Zealand cheese. It is estimated that it handles 95 per cent. (about 20,000 tons per annum) of the London imports of Canadian cheese and one-third (about 25,000 tons) of the New Zealand supplies landed in London. In addition, but to a much less extent, the warehouses of the Authority are used for the storing and maturing of Stilton cheese and, in the summer months, for storing Gorgonzola.

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* " The Port of London Authority," by J. H. Estill, O.B.E., Journal of the Royal Society of Arts, 4th January, 1929.

The period of storage varies with such circumstances as the condition of the cheese, the state of the market and the rate of arrivals. It is estimated, for example, that the average length of storage of Canadian cheese at the Port of London Authority's warehouses is 6 weeks.

(vii) Cool-Air Storage.

Storage of cheese under cool-air conditions is, as yet, mainly confined to imported supplies. As already indicated, it is adopted with New Zealand cheese and with a proportion of Canadian supplies during transport to the United Kingdom; it is also a common feature of storage conditions at the ports of London, Liverpool and Manchester. In the past, cool-air storage of cheese, especially during ocean transport, has had certain disadvantages, the chief of which have been the development of "soft crowns" and retardation of maturity. The former fault is apparently caused by condensation of moisture on the cheese and would appear to be mainly a question of refrigerating technique. Recently, improvements have been made and a number of steamers are now equipped with refrigerating installations, which, it is hoped, will help to eliminate this source of loss. As a preventive, in the New Zealand trade, it is recommended that a space of at least half an inch be allowed between the end of the cheese and the wood of the crate in order to permit of free circulation of air. (See also page 89.)

Retarded maturity is a tendency to which New Zealand cheese, particularly, has been subject, and in the light of experience the normal storage temperature has lately been increased to just over 50° F. Canadian cheese is usually stored at a temperature between 50° and 55° F.

Artificial refrigeration is not commonly employed in the storage of home-produced cheese; it is used, however, to some extent, with Stilton, Lancashire (Fig. 52) and Cheshire cheese. The installation of refrigerating equipment on factors' premises is exceptional, but the renting of cold-storage accommodation by factors and, in some cases, by retailers is a rapidly growing practice, especially in the Cheshire cheese trade. Cold-storage accommodation for Cheshire cheese is centralised in Manchester, where accommodation equipped for this purpose has already a capacity for approximately 30,000 cheese and is on the increase. Cheese begin to go into these stores in June; by the end of the following March the stores are again clear. The temperature maintained is 40° F. The cheese are turned every nine days while in store. If well selected to begin with, the cheese improve considerably in cool store, and lose little weight.

(viii) Storage Rates.

(1) *London.*—Charges at the Port of London Authority's warehouses include (a) port rates, (b) storage rates and (c) operative charges.

(a) The port rate payable on cheese is 1*s.* 6*d.* per ton.

(*b*) Ordinary storage is not now employed. The rates for cool-air storage are classified as below :—

	Per Ton. s.	d.
CHEESE, IN PACKAGES, n.o.r.*		
Stored in a Temperature of less than 40 deg. Fahr.		
Consolidated Rate, including receiving into store, rent for 28 days and delivery to land conveyance	31	6
Rent per week after 28 days	6	0
Stored in a Temperature of 40 deg. Fahr. or over (Royal Victoria and Albert Docks and Surrey Commercial Docks).		
Consolidated Rate, including receiving into store, rent for one week from first date of landing and delivery to land conveyance—		
From 1st November to 31st March	15	0
From 1st April to 31st October	17	0
Rent per week after one week—		
From 1st November to 31st March	1	0
From 1st April to 31st October	2	3
NEW ZEALAND CHEESE, IN PACKAGES.		
Stored in a Temperature of not less than 40 deg. Fahr. (Royal Victoria and Albert Docks and Surrey Commercial Docks).		
Consolidated Rate, including receiving into store, rent for one week from first date of landing and delivery to land conveyance—		
From 1st November to 31st March	15	0
From 1st April to 31st October	17	0
Rent per week after one week—		
From 1st November to 31st March	1	0
From 1st April to 31st October	2	3
CANADIAN CHEESE, IN PACKAGES.		
Stored in a Temperature of 50 deg. Fahr. or over.		
Landing, opening for Customs and delivery to land conveyance, with two weeks' rent from and including the first date of landing	14	0
Rent per week after two weeks	1	0
Consolidated Rate, including lighterage, receiving into store, rent for two weeks from first date of landing and delivery to land conveyance...	17	7
Rent per week after two weeks	1	0
For immediate delivery, when landed from vessels discharging in the Surrey Commercial Docks :—		
Landing, opening for Customs and delivery to land conveyance within one week of first date of landing	12	0

* Not otherwise rated.

CHEDDAR CHEESE, UNPROTECTED, AND STILTON.

Stored in a Temperature of 40 deg. Fahr. (Surrey Commercial Docks).

		s.	d.
Consolidated Rate, including receiving into store, rent for 28 days and delivery to land conveyance	*Per cwt.*	2	9
Rent per week after 28 days	*Per ton*	7	0

GORGONZOLA CHEESE, IN PACKAGES.

(*Stored at Surrey Commercial Docks.*)

Consolidated Rate, including receiving into store, rent for 28 days and delivery to land conveyance	*Per cwt.*	3	3
Rent per week after 28 days	*Per ton*	11	3

(c) Operative charges.—The charges for the principal services provided for cheese in store are as follows :—*

	Per Ton. s.	d.
Weighing net—boxes	8	0
„ „ —crates	8	0
Weighing net and putting aside—boxes	9	8
Weighing gross at delivery	2	8
Copying marked weights at delivery	1	8
Opening for inspection and reclosing in accordance with labour and materials supplied, but not less than ...	6	8
Turning over in store and copying marked weights ...	3	4
Turning in pile	2	8

(2) *Manchester.*—In Manchester, the charge for storage of Cheshire cheese in cool store is 12*s.* per ton for receiving, seven days' storage and delivery to road or rail alongside store. After the first seven days, the weekly rate is 3*s.* 6*d.* per ton.

(3) *Bristol.*—The scheduled charges on cheese stored between 40 deg. and 45 deg. Fahr. at Bristol (Royal Edward and Avonmouth Docks) are as follows :—

	Per Ton.† s.	d.
(*a*) Dock dues	2	6
(*b*) Short Period Storage.—Receiving at ship's rail, transferring to cold-stores, sorting to marks, stacking and delivery to railway vans or road vehicles, including storage for 7 days	10	0
Rent for each subsequent 7 days or part thereof, up to 21 days from date of storage	2	0

(4) *Southampton.*—At Southampton Docks, a consolidated import rate of 10*s.* 6*d.* per ton on cheese in boxes is applicable. This rate is for ordinary day working only and is chargeable for receiving from ship, sorting to marks, stacking in shed, unstacking, loading to rail, wharfage, dues, and haulage over dock lines as far as such

* All less 10 per cent.

† Subject to a surcharge of 10 per cent. until further notice.

services are required. If the cheese is not cleared within 14 days from the date of the ship's entry a warehousing rate of 4*s.* per ton is charged and the rent per week thereafter is 7½*d.* per ton, less 10 per cent. Extra charges are as follows :—

Turning out boxes, weighing net and repacking	4*d.* per box.
Recording marked weight	½*d.* „

These charges cover ordinary storage only. A private cold-storage firm has cool-air accommodation in the Docks which is available for cheese as required.

(5) *Cardiff.*—At Cardiff, the charges are as follows :—

	Per Ton.	
	s.	*d.*
Wharfage	1	0¾
Discharging	2	0
Warehousing (ordinary storage and re-delivery)	6	0
Rent, per week, after 72 hours	0	4½

PART VII.—WHEY.

CHAPTER XX.

(i) Nature.

The main product, cheese, contains most of the fat and casein and a small proportion of the water, milk-sugar and ash originally contained in the milk. The by-product whey is a liquid containing most of the water, milk-sugar, albumin and ash present in the raw material, together with a small proportion of the fat and casein. The solids of the milk are almost equally divided between the cheese and the whey. The casein with associated mineral matter and at least nine-tenths of the fat go to make the cheese. The milk-sugar, albumin and most of the mineral matter are found in the whey.

The distribution of each constituent is subject to considerable variation; the solid constituent most liable to variation in the distribution as between cheese and whey is the fat. Inefficient methods of cheese making are liable to cause an excessive quantity of fat to escape in the whey, and thus to reduce the weight of cheese made from a given quantity of milk as well as to detract from the palatability of the cheese.

(ii) Utilisation in Stock Feeding.

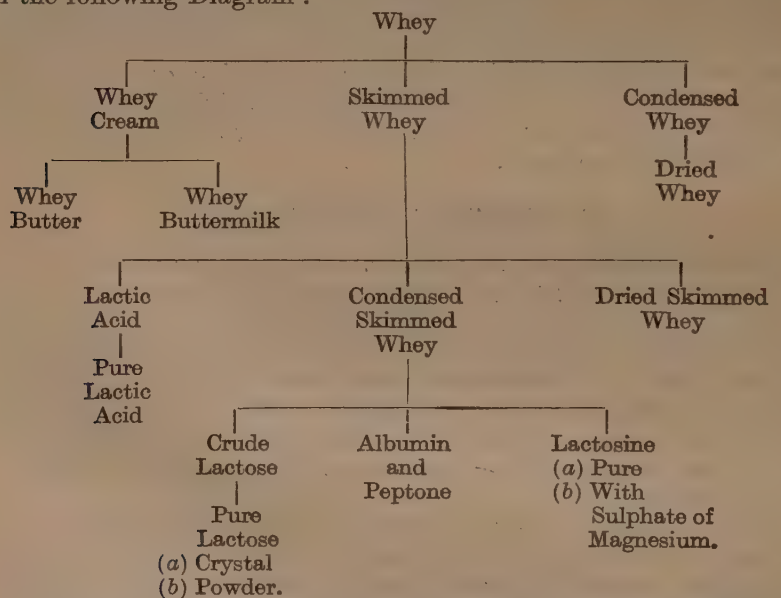
The whey itself may be put to a considerable number of uses. The commonest method of utilising whey is by feeding to stock. In spite of its dilute state, whey has a feeding value above its calculated starch equivalent. The mineral salts of milk are for the most part contained in the whey, and are in an assimilable form which makes them particularly useful to growing stock. Further, they are not easily obtainable in any other food. The actual value of whey to the stock-owner may be placed as high as 1*d.* per gallon.

Whey is chiefly used as a food for pigs, though fresh whey is also used for calf rearing and for making up wet mashes for poultry. Pig keeping almost invariably accompanies farm cheese making: it provides a means of disposing of the by-product at the point of production and usually dovetails easily into the general farming system. Pig keeping as a means of disposal of whey produced at a factory is less satisfactory. Where pig feeding is carried on at the factory itself, it constitutes an additional enterprise requiring a special staff and involving the purchase of all foodstuffs other than the whey. The quantity of whey available fluctuates much more widely than on the farm, especially at creameries where

cheese making is only a means of utilising milk surplus to the requirements of the liquid milk trade. Pig feeding is not, therefore, largely carried on at factories. In some cases, the whey is returned to the milk-supplying farmer, frequently free of charge. The ideal system, from the standpoint of economy, would be to use the same churns for the transport of milk from farm to factory as for the transport of whey from factory to farm. This, however, is often impracticable in this country owing to the fact that many farmers do not or cannot properly cleanse the churns after removing the whey and before refilling with milk. The only alternative is the maintenance of two sets of churns, which is uneconomical and complicates transport arrangements. This difficulty, in fact, largely hinders the disposal of factory whey to the milk-supplying farmers and it is frequently allowed to go to waste ; as an objectionable effluent, it presents further problems.

(iii) Manufactured Products.

The products which can be manufactured from whey are shown in the following Diagram :—



(*a*) *Whey Butter.*—When the volume of whey is sufficient, the butter-fat it contains is usually recovered for manufacture into whey butter. The average output of whey butter per 100 gallons of whey is about 3 lb. ; its price varies according to its quality from 1*s.* to 2*s.* per lb. The fat is recovered either by skimming or by mechanical separation. Butter made from whey cream alone is apt to have an unpleasant flavour, but this may be masked by mixing the whey cream with pure cream before churning.

The resulting product is saleable at the same prices as ordinary butter. The practice of partly skimming the cheese-milk and mixing the cream with the whey cream for butter making has been described and its economy discussed (pages 55 and 56). In factories which normally produce both cheese and butter or which manufacture a half-fat type of cheese, the blending of whey cream with pure cream for butter making, or the blending of whey butter and ordinary butter, enable full use to be made of all the milk-fat.

(*b*) *Condensed and Dried Whey.**—As it leaves the cheese vat, whey is such a heavily diluted feeding-stuff that its utilisation in that state is necessarily confined to the immediate vicinity of its production. It is natural, therefore, that attempts should be made to make it available in a more concentrated form, and so extend its market. The high cost of reducing its volume by the evaporation of some or all of the moisture, however, militates severely against the production by this method of an animal feeding-stuff at an economic price. The development of some method of utilising condensed or dried whey for human consumption—in the milling or bakery industries for example†—would make evaporation a more economic proposition.

(*c*) *Lactose.*—Lactose, or milk sugar, is the most important single constituent of the total solids in whey, and being of high value for industrial, feeding and pharmaceutical purposes, its extraction from the serum in which it is in solution is a well recognised corollary to cheese manufacture under factory conditions. It is, however, by no means a simple process. The costly evaporation of much of the moisture of the skimmed whey has to precede extraction of the sugar, even the impure milk sugar which is used for industrial purposes. Further refining of the crude milk sugar is necessary before lactose of sufficient purity for infant feeding and for pharmaceutical purposes can be obtained.

(*d*) *General.*—The problem of economic utilisation of whey is one of considerable importance to the factory cheese industry in this country; it is estimated that the total quantity of whey produced by cheese factories in Great Britain is approximately 20 million gallons, and most of it is wasted. One of the principal obstacles to the adoption of any method of whey manufacture is the large volume of whey required to make the process economical in view of the heavy capital cost of the condensing plant. Most factories in this country do not produce sufficient whey to maintain their own plant, and the transportation of whey supplies from a number of factories to a central condensing depot would be uneconomical, owing to the long distances between the cheese factories

* *See* Ministry of Agriculture Research Monograph No. 5, "The Whey Problem and a Solution."

† *See* Journal of the Ministry of Agriculture, September, 1928—"The Utilisation of Dried Whey in the Milling and Baking Industries."

and the low value of the commodity in proportion to its bulk. A further development of factory cheese making on the lines of bigger or more numerous factories would no doubt encourage the extension of whey condensation. The matter of economical whey disposal is thus bound up with that of the development of the cheese industry itself.

In other countries, such as New Zealand, Canada, the Netherlands and Italy, where the manufacture of cheese is centralised in factories dealing with large volumes of milk, the manufacture of whey products is an economic proposition.

PART VIII.—CONCLUDING OBSERVATIONS.

CHAPTER XXI.

Of the estimated total consumption of cheese in Great Britain, less than a quarter—including both farm-made and factory-made—is home-produced; of the rest, New Zealand and Canada together furnish over 90 per cent., the supplies from both of these Dominions being factory-made. From a quantitative standpoint, there is thus scope for a wide expansion of the cheese industry in this country. At present, the farm cheese industry, which accounts for about three-quarters of the output of cheese in Great Britain, meets to a large extent a specialised demand, and the question of expanding it to meet the demand of the mass of the population, if not even the question of maintaining its position in the face of the competition of imports, is dependent on the solution of a number of marketing problems, of which one of the most important is that of attaining greater uniformity and dependability of product.

The quality of the best home-produced farm-made cheese, as shown by competitive prices, is higher than that of the best imported produce, while the quality of the latter is, on the average, superior to that of the home-produced creamery product. Unfortunately, the proportion of the farm output which commands top prices is not large and its merits are largely offset by the variable quality of the remainder. In the nature of things, the farm-made product does not lend itself to widespread standardisation, but it is certainly both possible and desirable to secure greater uniformity of quality than is the case to-day. Admittedly, the conditions obtaining in exporting countries differ from those in Great Britain, and it is not suggested that the methods adopted by overseas competitors in regard to the control of quality—in the widest sense of the term—can be rigidly followed here. Nevertheless, the same principles can—indeed, must—be applied. Accordingly, a suggested scheme for grading home-produced cheese and marking it with the National Mark is outlined in the present Report (Chapter IX). The scheme embodies recognised principles and is adapted, as regards procedure and administration, to the conditions obtaining in this country. Such a scheme should lead to the production of a more uniform home product of high quality and also stimulate demand for it.

It is the intention that the National Mark scheme should be applicable to both farm and factory-made cheese of the desired quality. While the advantages of the farm cheese-making industry in respect of the production of the choicest quality cheese and the economical utilisation of whey are considerable, the production of a commodity, which will meet mass-demand and can be

marketed in accordance with the requirements of modern distribution, may be more likely attained, taking the long view, under the factory system with its large-scale operations, lower costs and more uniform product. At present, the factory manufacture of cheese in this country tends, in the main, to be regarded as merely ancillary to the distribution of fluid milk. With the expansion of milk production, however, the factory cheese industry will assume increasing importance, and its present handicaps of low-quality output, due, in large measure, to insufficient regard to the quality of the raw material, and of wastage of the by-product, because the scale on which it is produced is not sufficient to justify the installation of condensation or dehydration plants, would or could be largely removed.

The horizontal combination of the cheese factories into some form of organisation for the collective purchase of milk supplies and the collective marketing of the product would, however, seem to be essential if, in the interests of the dairying industry, the best results are to be achieved with the factory product. Looking back to the farm cheese-maker, too, the need for organisation is obvious and pressing (Chapter XIV). Indeed, the progress of the cheese industry as a whole is palpably hampered by its comparatively unorganised condition. Thus, the problem of establishing a standard of butter-fat content for cheese sold in this country could be satisfactorily solved if cheese producers, both farm and factory, were organised comprehensively, according to varieties produced, so that they could administer their own control system for the marking of home-produced cheese made from whole milk (Chapter VIII.). Such a system would also be the foundation for the more elaborate system of quality grading required for National Mark purposes, while the all-embracing organisation of cheese producers here envisaged would also be in a position to stimulate the demand for the home product of high quality by advertisement and other forms of publicity. Organisations for the administration of butter-fat control and for such services as advertising need not actually handle the product; other cheese-producing countries provide examples of what can be accomplished, in the direction of marketing improvement, by non-trading regulatory bodies established by producers, in the interests of producers, and to which all producers are subject. Finally, the bearing of the cheese industry on the dairy industry as a whole—its function as a balancer of supply and demand in the liquid-milk market—connects it with still wider problems which, again, depend for solution on the creation of some comprehensive organisation of milk producers generally.

Markets Division,
Ministry of Agriculture and Fisheries.

September, 1930.

TABLE I.—*Estimated Quantity and Value of Cheese produced in Factories in Great Britain in* 1924.*

Description.	Cheese Produced in Factories and Creameries.		Cheese Produced by Dairy Firms mainly selling Milk.		Total Factory Production.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£
Hard Cheese	129,000	559,000	58,000	227,000	187,000	786,000
Soft Cheese	22,000†	201,000	1,000	6,000	23,000	207,000
Total	151,000	760,000	59,000	233,000	210,000	993,000

* Third Census of Production, 1924, Preliminary Report No. 19, Board of Trade Journal, July 21st, 1927.

† In the Census of Production, a certain proportion of the soft cheese manufactured by factories and creameries was returned by value only. The weight of this proportion is estimated at 5,000 cwt., which figure is included in the 22,000 cwt. here quoted.

TABLE II.—*Exports of Home Produced Cheese from the United Kingdom* in the Years* 1908, 1913 *and* 1923-9.

	Description.	1908.	1913.	1923.	1924.	1925.	1926.	1927.	1928.	1929.
British Countries	Hard Cheese ...	Cwt. (*Not classified*)	Cwt. (*Not classified*)	Cwt. 6,179	Cwt. 5,658	Cwt. 5,961	Cwt. 6,757	Cwt. 9,824	Cwt. 10,807	Cwt. 13,375
	Soft Cheese ...			271	150	151	1,041	2,170	2,051	2,701
	Total ...	5,341	5,406	6,450	5,808	6,112	7,798	11,994	12,858	16,076
Foreign Countries	Hard Cheese ...	(*Not classified*)	(*Not classified*)	1,870	1,611	11,214	15,022	32,731	32,899	34,126
	Soft Cheese ...			122	108	84	3,913	3,160	6,492	6,833
	Total ...	3,456	3,484	1,992	1,719	11,298	18,935	35,891	39,391	40,959
	Gross Total	8,797	8,890	8,442	7,527	17,410	26,733	47,885	52,249	57,035

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE III.—*Imports of Cheese into the United Kingdom* in the Years* 1901–13 *and* 1922–9, *with Re-exports and Balance retained for Home Consumption.*

Year.	Imports.		Re-exports.		Imports Retained for Home Consumption.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£
1901	2,586,837	6,227,135	55,069	163,579	2,531,768	6,063,556
1902	2,546,212	6,412,002	51,863	156,628	2,494,349	6,255,374
1903	2,694,358	7,054,710	51,389	155,590	2,642,969	6,899,120
1904	2,554,297	5,843,770	53,180	157,123	2,501,117	5,686,647
1905	2,442,682	6,339,811	52,302	159,206	2,390,380	6,180,605
1906	2,638,794	7,607,641	55,117	179,051	2,583,677	7,428,590
1907	2,372,233	6,905,509	52,292	173,538	2,319,941	6,731,971
1908	2,306,086	6,684,203	56,902	183,334	2,249,184	6,500,869
1909	2,390,090	6,829,863	57,704	180,349	2,332,386	6,649,514
1910	2,456,340	6,809,876	64,570	203,173	2,391,770	6,606,703
1911	2,348,326	7,140,042	52,489	182,248	2,295,837	6,957,794
1912	2,308,787	7,414,091	69,297	245,175	2,239,490	7,168,916
1913	2,297,340	7,035,039	65,448	238,377	2,231,892	6,796,662
1922	2,659,345	12,437,818	25,974	138,681	2,633,371	12,299,137
1923	2,838,546	15,260,707	41,399	229,147	2,797,147	15,031,560
1924	2,887,513	13,552,406	47,865	274,097	2,839,648	13,278,309
1925	3,098,702	15,696,800	138,883	796,969	2,959,819	14,899,831
1926	3,014,055	13,940,648	39,167	223,162	2,974,888	13,717,486
1927	2,949,082	13,493,668	39,343	216,536	2,909,739	13,277,132
1928	3,005,237	14,997,173	30,401	178,515	2,974,836	14,818,658
1929	2,994,038	13,914,639	32,037	179,505	2,962,001	13,735,134

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE IV.—*Average Annual Imports of Cheese into the United Kingdom* in 4 Five-year Periods* (1900–4, 1909–13, 1920–4 *and* 1925–9) *distinguishing the Principal Sources of Supply.*

Country of Origin.	Annual Averages for Five Years ended :—							
	1904.		1913.		1924.		1929.	
	000 Cwt.	Per cent.	000 Cwt.	Per cent.	000 Cwt.	Per cent.	000 Cwt.	Per cent.
New Zealand	70·0	2·7	462·3	19·6	1,341·3	48·1	1,571·2	52·2
Canada	1,703·6	65·1	1,458·6	61·8	1,056·1	37·8	959·4	31·8
Australia	·7	—	5·3	0·2	66·8	2·4	57·4	1·9
Other British Countries ...	·2	—	—	—	3·6	0·1	3·9	0·1
Total British Countries ...	1,774·5	67·8	1,926·2	81·6	2,467·8	88·4	2,591·9	86·0
Netherlands	292·7	11·2	257·1	10·9	153·4	5·5	196·9	6·6
Italy	1·9†	0·1	86·1	3·7	58·3	2·1	143·4	4·7
United States	439·4	16·8	57·4	2·4	40·7	1·5	12·2	0·4
France	35·8	1·4	18·7	0·8	13·1	0·5	24·0	0·8
Switzerland	†	—	11·6	0·5	14·9	0·5	29·4	1·0
Belgium	71·6	2·7	0·8	—	11·5	0·4	2·3	0·1
Denmark	—	—	—	—	24·2	0·9	7·4	0·2
Other Foreign Countries ...	1·6	—	2·3	0·1	6·7	0·2	4·8	0·2
Total Foreign Countries ...	843·0	32·2	434·0	18·4	322·8	11·6	420·4	14·0
Gross Total	2,617·5	100·0	2,360·2	100·0	2,790·6	100·0	3,012·3	100·0

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

† The true imports from Italy and Switzerland during this period were probably considerably higher, but are masked by the practice previous to 1905 of returning imports under the country from which they were shipped direct. Some Italian and Swiss mports may thus have been included in those from France.

TABLE V.—*Monthly Imports of Cheese into the United Kingdom* in the Years* 1923–9 *and the Average Monthly Imports for the Period* 1923–9.

Month.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	7 years' Average.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
January	183,738	148,352	271,979	347,761	278,360	224,177	345,114	257,069
February	248,774	348,366	242,293	169,717	201,493	272,454	316,284	257,054
March	160,926	272,874	245,739	238,008	296,347	318,578	227,778	251,464
April	302,981	174,753	265,534	230,465	182,535	192,795	242,763	227,404
May	246,003	308,517	222,303	216,470	220,098	281,118	237,939	247,493
June	291,717	154,674	254,649	232,139	275,187	240,514	218,749	238,233
July	165,564	242,737	331,670	388,224	237,188	223,228	232,415	260,147
August	328,329	284,322	299,275	302,961	289,630	328,872	270,069	300,494
September	198,972	242,582	227,431	205,393	269,291	192,562	194,227	218,637
October	235,570	305,038	265,078	237,237	221,757	245,852	234,168	249,243
November	255,365	213,945	162,645	238,893	277,665	294,352	250,664	241,933
December	223,315	193,299	313,557	206,035	199,597	191,850	224,354	221,715

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE VI.—*Average Wholesale Prices per lb. of certain Varieties of Cheese during certain Months of the Year* 1929.

——	March.	June.	September.	December.
English Varieties :—	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Cheshire	11¾	8¾	9½	1 2
Cheddar (Farmhouse)	1 2¾	1 1½	11	11¼
„ (Factory) ...	—	8½	9	9
Lancashire	10½	9¾	11¼	11¾
Derby	—	9	9½	—
Leicester	10½	9	10	1 1
Caerphilly	10½	8½	9¼	11¾
Stilton	1 6	1 6	1 5	1 8
Imported Varieties :—				
Cheddar (Canadian)	1 0	11¾	10	10½
„ (New Zealand)	10	9¾	10	10
Edam 40% fat ...	9¼	7½	9¼	10
„ 30% „ ...	7½	6½	7½	8¼
„ 20% „ ...	5¾	5¾	6¼	6½
Gruyère (Swiss) ...	1 4	1 4	1 3½	1 4
Gouda 45% fat ...	—	8½	10	11
„ 40% „ ...	9¼	7½	8½	9¼
„ 30% „ ...	7	5¾	7½	7½
„ 20% „ ...	5¾	5½	6	6½
Parmesan	1 10	1 10	1 10	1 10
Gorgonzola ...	1 0½	11¾	10	10½
Roquefort	1 4¾	1 5½	1 6½	1 6¼
„ (Danish)	11½	10¾	10½	11
Camembert	1 9	1 6½	1 9	1 9

TABLE VII.—*Annual Quantities of Cheese sold at certain Cheese Fairs in England in the Years* 1925–9.

Year.	Cheshire Cheese.			Lancashire Cheese.	Caerphilly Cheese.
	Whitchurch	Nantwich.	Chester.	Preston.	Highbridge.
	Tons.	Tons.	Tons.	Tons.	Tons.
1925 ...	1,274	1,016	706	249	1,162
1926 ...	1,576	1,187	1,023	369	1,038
1927 ...	1,619	1,116	1,128	353	1,341
1928 ...	1,323	1,077	1,028	335	1,032
1929 ...	1,263	1,151	989	390	1,141
Average	1,411	1,109	975	339	1,143

TABLE VIII.—*Imports of Cheese into certain Ports of the United Kingdom in the Years* 1925–9.

Port.	1925.	1926.	1927.	1928.	1929.	Percentage of total average annual imports 1925–9.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Per cent.
London	2,084,923	2,063,843	2,095,478	3,110,941	2,184,682	73·2
Liverpool	269,084	222,713	194,548	210,289	189,721	6·3
Bristol	174,860	180,049	162,634	178,005	153,684	5·1
Glasgow	93,727	91,553	69,020	77,870	100,351	3·3
Folkestone	87,700	78,148	85,131	50,624	57,137	1·9
Manchester	91,413	85,408	56,513	60,364	39,914	1·3
Newcastle	68,137	60,982	57,095	51,936	47,909	1·6
Hull	43,973	48,652	46,084	69,607	53,198	1·8
Leith	42,616	41,152	41,396	39,714	36,079	1·2
Harwich	37,824	42,505	44,742	49,752	52,641	1·7
Cardiff	42,913	41,689	29,737	37,302	19,572	0·6
Southampton	23,156	15,660	15,030	14,488	11,180	0·4
Goole	8,080	11,618	28,029	29,579	18,552	0·6
Other Ports	22,910	21,189	14,005	15,008	29,418	1·0

APPENDIX A.

COMPULSORY CLASSIFICATION OF CHEESE BY COMPOSITION IN VARIOUS COUNTRIES.

Country.	Class of Cheese.	Minimum percentage of Fat in the Moisture-free Substance.		Maximum percentage of Moisture in the Bulk.	
		Export Trade.	Internal Trade.	Export Trade.	Internal Trade.
Australia	Cheese	50	50†	—	—
	Skimmed-milk ...	—	10†	—	—
Canada ...	Whole-milk	45	45†	—	—
Denmark	Type 1. Hard Cheese ...	45	45	50	50
	„ 2. „ „ ...	40	40	52	52
	„ 3. „ „ ...	30	30	54	54
	„ 4. „ „ ...	20	20	57	57
	„ 5. „ „ ...	10	10	59	59
	„ 6. Skimmed-milk cheese...	—	—	60	60
	„ 7. Soft Cheese ...	45	45	60	60
	„ 8. „ „ ...	30	30	60	60
	„ 9. „ „ ...	20	20	60	60
	Roquefort	50	50	52	52
Finland	Full-fat	45	—	—	—
	Half-fat...	30	—	—	—
	Quarter-fat	15	—	—	—
Italy	Full-fat	—	42	—	—
	Half-fat...	—	20	—	—
Netherlands	Full-fat	46	46	—	—
	Half-fat... ...	40	40†	—	—
		30	30†	—	—
		20	20†	—	—
New Zealand	Cheese	50	50†	—	—
	Skimmed-milk ...	—	10†	—	—
Norway	Whole-milk	45	45†	—	—
	Half-fat...	28	28†	—	—
	Quarter-fat	18	18†	—	—
	Skimmed-milk ...	—	—	—	—
South Africa	Cheese	50	—	—	—
Sweden	Whole-milk	—	45	—	—
	Half-fat...	—	30	—	—
Switzerland	Whole-milk	—	45†	—	26–36*
	Three-quarter-fat ...	—	35†	—	28–38*
	Half-fat...	—	25†	—	—
	Quarter-fat	—	15†	—	—
	Skimmed-milk ...	—	—	—	—
United States	Cheese	—	50†	—	—

* Emmenthal Cheese.

† Applicable to both home-produced and imported cheese.

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APPENDIX B.

RATES FOR CONVEYANCE OF CHEESE AND RETURNED EMPTIES BY MERCHANDISE TRAIN.*

Journey.	Standard Rates, S. to S., Per ton. Class 14.	Class 15.	Class 18.	Exceptional Rates, Per ton.	Returned Empties. Rate per Cwt. S. to S.	C. & D.
	s. *d.*	*s.* *d.*	*s.* *d.*		*s.* *d.*	*s.* *d.*
Castle Cary to London ...	36 4	39 0	46 4		1 5	2 0
Trowbridge to London ...	—	—	42 0	Groceries, "List H," 36*s.* 6*d.* Carted in London ...	1 0	1 7
				Cheese, Class 18, 44*s.* 6*d.* C. & D., 2 tons, O.R.		
„ „ Birmingham	36 6	39 3	46 7		1 5	1 9
Highbridge to Cardiff	27 3	29 3	—	Cheese, Class 18 { 29*s.* 10*d.* Carted in Cardiff; 29*s.* 2*d.* „ „ 1 ton; 28*s.* 6*d.* „ „ 2 tons	1 0	1 4
Whitchurch (Salop) to Manchester.	20 8	22 0	—	Cheese, Class 18 { 21*s.* 7*d.* Carted in Manchester, O.R.; 23*s.* 10*d.* C. & D., O.R.; 20*s.* 10*d.* C. & D., O.R., 2 tons; 26*s.* 8*d.* C. & D.	6	10
Whitchurch (Salop) to Leeds	29 4	31 6	37 4		1 0	1 4
Whitchurch (Salop) to London	46 3	49 4	58 11	Cheese, Classes 14 & 15, 50*s.* 4*d.* C. & D., O.R. ...	1 10	2 5
Leyburn (Yorks.) to Newcastle on-Tyne.	—	28 9	34 2	Provisions, "List T," 28*s.* 3*d.* C. & D.	1 0	1 4
Melton Mowbray to London ...	—	—	43 10	Cheese in Classes 14 and 15, 38*s.* C. & D.	1 5	2 0
March to London	—	—	37 11	Groceries, "List H," 35*s.* C. & D.	1 0	1 7
London to Birmingham ...	—	—	55 2†	Cheese in Classes 14 and 15 { 38*s.* C. & D., 1 ton; 35*s.* 10*d.* C. & D., 2 tons		

* The Standard Rates apply except where blanks appear in the Standard rates column when the rates quoted in Exceptional Rates column apply.

† C. & D.

S. to S.=Station to Station. C. & D.=Collection and Delivery. O.R.=Owner's Risk.

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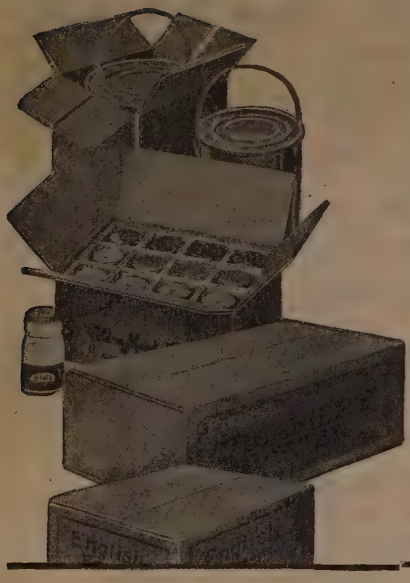

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MINISTRY OF AGRICULTURE AND FISHERIES

Report on the MARKETING OF DAIRY PRODUCE IN ENGLAND AND WALES

PART II
BUTTER AND CREAM

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FIG. 1.—Witney (Oxon.) Butter Cross.

THE MARKETING OF DAIRY PRODUCE IN ENGLAND AND WALES.

PART II.—BUTTER AND CREAM.

INTRODUCTION.

Two previous Reports in this Series* have dealt with the marketing of milk and cheese, respectively. This Report is concerned with butter and cream. It is divided into two sections, the first dealing with butter, the second with cream. The cream section is confined so far as possible to the marketing of cream for immediate consumption. The sale of cream to creameries for butter manufacture, which is common in some countries and occurs in England and Wales to some extent, is regarded as part of the process of butter marketing and is therefore treated in the section on butter.

Butter ranks as one of the six most important foodstuffs consumed in this country. The total value of all supplies available for consumption annually in Great Britain during recent years is estimated at about £54 million. But the home butter industry is as yet a relatively unimportant branch of British agriculture. It is practically confined to small-scale production for local requirements in districts out of range of the liquid milk market and on scattered farms throughout the country. The total value of the home output amounts to less than £7 million per annum and its production absorbs less than 14 per cent. of all milk produced. Unlike cheese production, the manufacture of butter is not undertaken to any great extent by large-scale milk distributors as a means of disposing of milk surplus to their day-to-day requirements.

The butter market is thus a vast potential outlet for home-produced milk, and the pressure of milk supplies may before long force the British dairy industry to exploit that market extensively. It is true that the problem of developing the butter industry in this country is not so much an aspect of butter marketing as of the wider problem of organizing marketing in the milk industry as a whole. But, in examining the methods of marketing home-produced butter in the restricted field which it now supplies, it is, nevertheless, desirable to keep prominently in view their suitability for the larger task of supplying the big urban centres. That consideration, therefore, will be found to underlie the butter section of the Report. If it is thought that little is done to indicate where the marketing of farm butter might be improved, it is because

* *The Fluid Milk Market in England and Wales* (Economic Series No. 16) and *The Marketing of Dairy Produce in England and Wales. Part I.—Cheese* (Economic Series No. 22).

4898. Wt. 1194—3081/36. 5.000. 5/32. Wy. & S. Gp. 2.

farm butter cannot, in the nature of things, be adapted to large-scale distribution. If only from the standpoint of market requirements, development must be on the lines of centralized manufacture. The marketing methods in the main butter-producing countries, where production is almost entirely centralized, are described at some length in the Report, and are used as a basis for framing a standardization policy for the embryo creamery industry that already exists in this country.

The production of cream is a smaller business altogether. About £2½ million-worth of cream are consumed annually in this country, of which the home dairy industry supplies £2 million-worth. As with butter, the farm producer chiefly caters for a local market. The needs of the towns are mainly met by large-scale production in country creameries and in the depots of large urban milk distributors, though the small milk retailer also plays a part. There certainly appears to be scope for a considerable increase in the consumption of cream. Accordingly, the cream section of this Report deals with the marketing of cream mainly from the standpoint of increasing demand, and those improvements that are suggested—in particular, the production of a cheaper cream of lower but guaranteed fat-content and the standardization of grades and containers for cream—are put forward with that end in view.

SECTION I.

BUTTER.

PART I.—A PRELIMINARY SURVEY.

CHAPTER I.—SUPPLIES.

(i) Home Production.

(a) **Relation to other Dairy Products.**—Butter production in England and Wales does not absorb a large proportion of the total milk output—less than 14 per cent., on the average, in recent years. Milk producers, where possible, endeavour to dispose of their milk for the supply of the liquid milk market. Where farms are not suitably situated for this, the choice lies between cheese-making and butter-making, or, alternatively, the supply of milk or cream to local creameries for manufacture. Though cheese brings in a greater income per gallon of milk than butter, the choice is determined not so much by the relative returns from the two products as by other factors, such as the conditions prevailing on the farms and the requirements of the farming system. The quantity of milk available daily may be too small to justify cheese-making, or the necessary accommodation and technical skill may be lacking. Butter, too, gives a quicker cash turnover than cheese—a factor of considerable importance to many producers. If the system of farming includes the rearing of stock, as is commonly the case in the remote and hilly districts where much of the butter is produced, butter-making has the advantage of providing separated milk for stock-feeding. On farms of this type, however, some or all of the cream, instead of being made into butter, may be sold for consumption fresh, if there is a convenient market for it.

A small proportion of the butter produced in this country is manufactured by creameries that specialize in its production, many of which are farmers' co-operative concerns.* Some butter is manufactured by large-scale milk distributors from milk surplus to the day-to-day requirements of the liquid milk market. In disposing of surplus milk, the distributive trade naturally adopts the method which gives the best return. Of the various alternative outlets available—butter, cheese, cream, condensed milk or milk powder—butter has been one of the least remunerative during recent years, and little butter is, therefore, made by the large-scale units concerned in milk distribution.

* See Economic Series No. 1, Ch. IV.

(b) **Quantities.**—The most recent official estimate of the production of butter on farms in England and Wales* is for the year ended 4th June, 1925, when it was computed at 569,000 cwt., of which some 115,000 cwt. were consumed in farm households, leaving a balance of 454,000 cwt. available for sale. Corresponding figures for Scotland† for the same year show that, in that country, the farm production of butter was about 52,000 cwt., consumption on farms 23,000 cwt., and sales off farms 29,000 cwt. Thus, the total estimated production of butter on farms in Great Britain in 1925 was 621,000 cwt. and the quantity sold off farms was 483,000 cwt.; more than one-fifth of the total output was consumed in farm households.

No accurate estimate can be made of the production of factory butter in this country owing to the difficulty, in the case of factories that both manufacture and blend, of distinguishing between butter actually made in the factories and that produced by the blending of purchased butter. From the figures given in the Report on the Industrial Census of 1924,‡ however, it is calculated that the quantity of butter produced in creameries and factories in Great Britain in 1924, together with that made by dairy firms whose principal business is the sale of liquid milk, amounted to roughly 53,000 cwt. §

The total quantity of butter produced in Great Britain on the basis of the 1924–5 figures was, therefore, in the neighbourhood of 674,000 cwt. per annum, and the quantity available for sale 536,000 cwt. The total butter output represents a milk equivalent of 178 million gallons, or 13·7 per cent. of the estimated total production of 1,288 millions.

There was a decline of approximately 45,000 cwt.—about 7 per cent.—in the amount of farm butter produced in this country in 1925 as compared with 1908. The factory output is believed to have increased somewhat during the period.

The decline in farm butter-making has not been general. It has occurred principally in districts which are favourably placed for milk selling, and the cause has been the relatively high prices realized for milk since the War. Changes in the production of butter do not occur rapidly. Butter-making often forms an

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* The Agricultural Output of England and Wales, 1925. Cmd. 2815/1927.

† The Agricultural Output of Scotland, 1925. Cmd. 3191/1928.

‡ Final Report on the Third Census of Production of the United Kingdom (1924.)

§ The preliminary figures of the fourth industrial census of production carried out by the Board of Trade in 1930, published in the *Board of Trade Journal*, 31st March, 1932, show that centralized production of butter in Great Britain has considerably increased since 1924. Statistics are only available for firms employing 10 or more workers but these firms are responsible for the bulk of the output; they show a net increase in production of about 34,000 cwt., or about 85 per cent.

integral part of a stock-rearing system of farming that does not readily change. Moreover, since butter-making is not the main consideration on these farms and milk requirements for calf raising are fairly constant, there is little inducement to increase the milk output; hence, the amount of butter manufactured shows little variation.

(c) **Location.**—Farm butter-making, owing to its relative simplicity, is carried on to some extent almost everywhere. There are, however, certain specialized butter-producing areas, in particular, Cornwall, Devon, the Isle of Wight, North and South Wales, the Lake District, parts of Yorkshire and Lincolnshire and a group of East Anglian counties—including the Isle of Ely, Huntingdon, West Suffolk and the Soke of Peterborough.

Devon is the county where butter-making absorbs the highest proportion of the milk produced; it is estimated that in this county about 44 per cent. of the milk is used for the purpose. In Cumberland and the Isle of Ely, 36 per cent. of the milk is converted into butter, in Cornwall 34 per cent., in Wales, as a whole, 27 per cent., and in Huntingdonshire, West Suffolk, the Isle of Wight, the Soke of Peterborough and Westmorland, over 22 per cent.

Elsewhere, butter-making is practised chiefly on small farms where the quantity of milk is either too small to sell or is surplus to sales requirements, and at the same time is insufficient for cheese-making.

As shown, a relatively high proportion—estimated at about 20 per cent.—of the total farm output of butter in England and Wales is consumed in farm households. Devonshire and Cornwall are the only areas with any considerable "export" trade, but the influx of summer visitors into these areas reduces the amount available for dispatch to other parts at that season. Where production is less intense, the quantities produced are generally insufficient for local needs and, even at the peak of the season, retailers usually need to supplement local with imported supplies.

The production of butter in creameries and factories is greatest in the south-western counties of Cornwall, Devon, Somerset and Dorset. Large-scale production of butter in other parts of the country, apart from that carried out in blending factories, is not important. Except in the case of a number of blending factories, the manufacture of butter is not the main activity.

(d) **Seasonality.**—The seasonal variations in farm butter production are related to the needs of the stock-raising system with which it is mainly associated. The general practice is to have the calves born in the early spring so that they can make use of the first season's grass after they are weaned; then, with one winter indoors, they are ready for sale after a second season's grass. Milk pro-

duction on grass in the spring and early summer is relatively cheap ; moreover, cows that calve down on these farms in autumn are often sold off at the high prices that rule at that season. For these reasons, and because also the quality of winter-made butter is not so fine as that produced in the pasturing season, farm butter production tends to be heaviest in spring and summer.

Generally, little or no attempt is made to even-up the winter and summer supply, even though the winter shortage is a disadvantage from the marketing standpoint and butter prices are higher in the winter season (see Chapter III).

(ii) Imports.

(a) **Quantities.**—Previous to 1886, imports of butter and margarine were not separately distinguished in the trade returns. The development of imports of butter into the United Kingdom* from that date until the end of the century is shown by the following figures :—

Year.	*Net Imports.* Cwt.
1886	1,481,000
1890	1,953,000
1895	2,768,000
1900	3,327,000

The total imports thus considerably more than doubled in the space of 14 years.

The increase has continued during the present century. The gross imports of butter into the United Kingdom, by quantity and value, together with the re-exports and the balance retained for home consumption, are shown, for each year from 1901 to 1913 and from 1922 to 1931, inclusive, in Table 1, page 145. The following figures summarize the general trend :—

Year.	*Net Imports.* Cwt.
1901	3,653,000
1905	4,077,000
1909	3,990,000
1913	4,033,000
1922	3,816,000
1926	5,592,000
1930	6,648,000
1931	7,720,000

In the pre-War period, net imports showed considerable annual fluctuation, but, on the whole, ceased to rise after 1904. Since the

* Imports of butter into the United Kingdom are almost entirely into Great Britain. Only about 50,000 cwt. per annum have been imported into Northern Ireland in recent years.

War, however, with the exception of 1927, net imports have shown a continuous and rapid increase; they have risen from about 3,816,000 cwt. in 1922 to 7,720,000 cwt. in 1931—an increase of over 100 per cent. in 9 years. The increase was particularly rapid during the period 1922 to 1926, when net imports rose by almost 50 per cent.* Development after 1926 was less rapid until 1931; in that year, there was an increase of more than 1 million cwt.—16 per cent.—over 1930. The main causes of the abnormal increase in imports in 1931 appear to have been a favourable season in New Zealand and Australia, the condition of the Australian exchange rate, and the financial difficulties in Germany which led to a reduction in the imports into that country from certain sources and an increase in shipments to the United Kingdom.

(b) **Sources.**—The principal countries from which butter has been obtained during the present century are shown in Table II, page 146, which gives the average annual quantities imported from the principal countries during the periods 1900–4, 1909–13, 1922–6 and 1927–30 and, for comparison, in 1931.

In recent years, the two main sources of imported butter have been Denmark and New Zealand, which, in the 4-year period 1927–30, supplied annually an average of 2,133,300 cwt. (or 34 per cent. of the total imports) and 1,335,700 cwt. (or 21·3 per cent.), respectively. Other important sources of supply are Australia with 770,100 cwt. (12·3 per cent.), the Irish Free State with 558,400 cwt. (8·9 per cent.), Argentina with 375,800 cwt. (6 per cent.) and Russia with 285,600 cwt. (4·5 per cent.). The remainder of the imports, amounting roughly to 20 per cent., are obtained chiefly from Sweden, the Netherlands and a number of Baltic countries including Finland, Estonia, Latvia and Poland.

The outstanding feature of the import trade is the increase both in the quantity and proportion of butter obtained from Empire sources since the War. This is only partly due to the inclusion of Irish Free State supplies in the import figures since 1923. Even in pre-War days, the relative importance of foreign sources of butter imports was already declining, although the actual quantities imported from those sources slightly increased. During the present century, the Empire share of the total butter imports rose from under 18 per cent. in the first 5 years to over 46 per cent. in the 5 years ended 1926. During the period 1927–30, there was a slight downward tendency, but the remarkable increase in butter imports in 1931 was almost entirely due to the development of Empire supplies, and in that year 48 per cent. of the total was obtained from Empire countries.

The increase in the proportion of Empire imports has been largely due to the growth of consignments from New Zealand and Australia, which in the 1900–4 period amounted to only 207,000 cwt. (5·3 per cent.) and 257,000 cwt. (6·8 per cent.),

* The Agricultural Output of England and Wales, 1925. Cmd. 2815/1927.

respectively, compared with over 1,335,000 cwt. (21·3 per cent.) and 770,000 cwt. (12·3 per cent.) in 1927–30.

The rate of development of the New Zealand butter trade—most of the exports of butter from New Zealand come to this country—has not been regular. Progress was relatively slow until after the War; during the 3 years 1920–2, however, exports to the United Kingdom were almost quadrupled. After 1922, they remained relatively steady until 1929, since when they have again increased rapidly. In 1931, 1,935,000 cwt.—24 per cent. more than in 1930 and 48 per cent. more than in 1929—were imported. This irregularity has been due partly to variations in climatic conditions, partly to the facilities (referred to in the Report on the marketing of cheese*) which the New Zealand factories possess for changing over from cheese to butter-making and vice versa.

Australian imports have shown considerable variation from year to year, owing mainly to climatic conditions and to the fact that a considerably higher proportion of the total output is retained for home consumption than is the case in New Zealand. In 1931, supplies from this source—amounting to 1,558,600 cwt.—increased to more than double the average for the years 1927–30.

Since the early years of the present century, Canada has practically dropped out of the United Kingdom butter trade, though there was some revival in 1931.

Supplies of butter from the Irish Free State since the War have been considerably less than in pre-War days,† but, since 1925, have been on the increase.

Imports of butter from Denmark remained fairly stationary until 1925 at about 1,600,000 to 1,700,000 cwt., but since that year have been increasing steadily.

Imports from the Netherlands and Sweden, which, before the War, made up respectively 8·1 per cent. and 5·1 per cent. of the total, have been considerably lower, both actually and relatively, since the War, but those from Sweden have been growing rapidly in recent years. Until the last few years, Russian and Siberian supplies were also lower than in pre-War days; in 1931, however, Russian imports rose to 404,000 cwt.—40 per cent. above the average for 1927–30. A relatively new source of supply since the War has been Argentina; this country, which supplied only 1·5 per cent. of the total in the 5 years ended 1913, supplied over 9 per cent. in the period 1922–6. Since 1926, however, imports from Argentina have decreased considerably.

(c) **Periodicity.**—The average monthly arrivals of butter during the period 1926–30, both in total and from each of the principal

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* Economic Series No. 22, p. 34.

† Imperial Economic Committee. Fourth Report, p. 45. (Cmd. 2725/1926.)

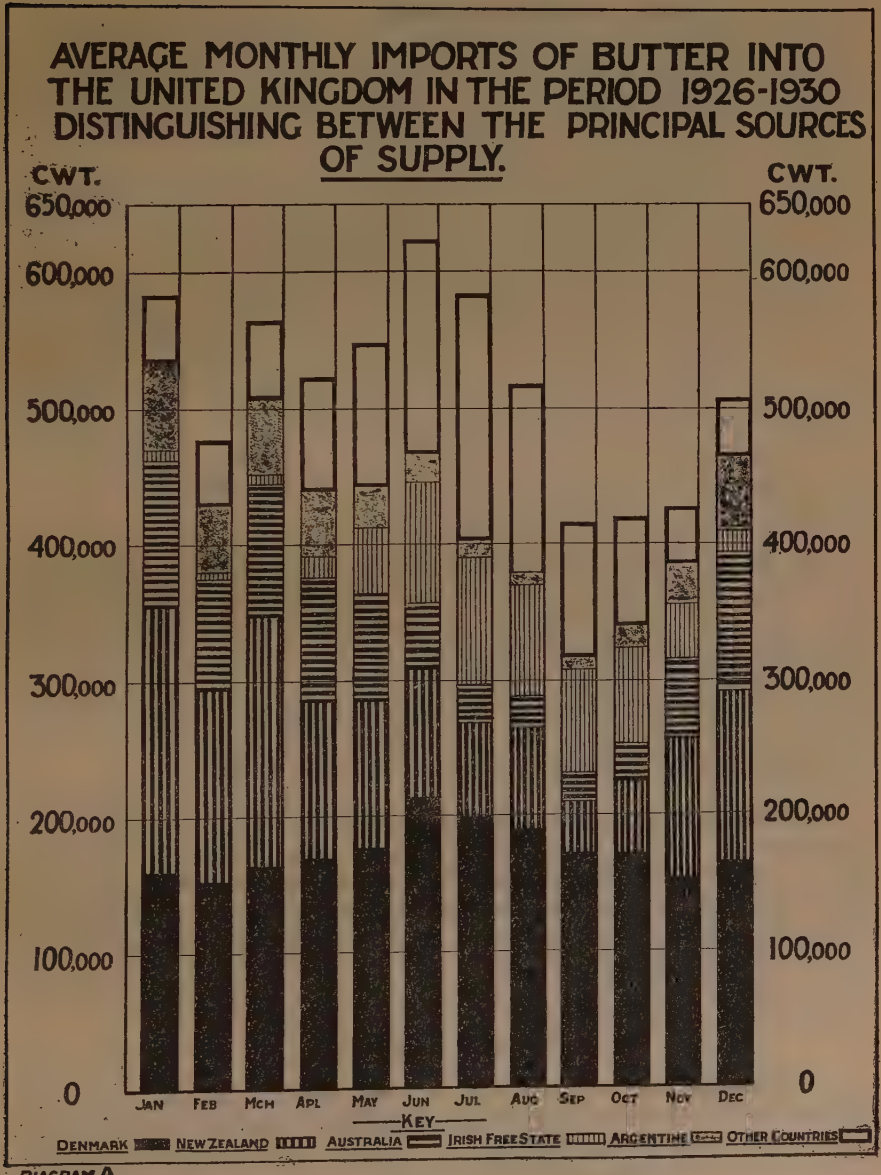
AVERAGE MONTHLY IMPORTS OF BUTTER INTO THE UNITED KINGDOM IN THE PERIOD 1926-1930 DISTINGUISHING BETWEEN THE PRINCIPAL SOURCES OF SUPPLY.
CWT.
650,000
600,000
500,000
400,000
300,000
200,000
100,000
0
JAN
FEB
MCH
APL
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
KEY
DENMARK
NEW ZEALAND
AUSTRALIA
IRISH FREE STATE
ARGENTINE
OTHER COUNTRIES

DIAGRAM A.

countries of origin, are shown in Diagram A. The total imports of butter do not show any marked seasonal trend, though on the whole they tend to be lower in winter. The maximum importation is generally attained in June and July.

Supplies from individual sources, however, show regular seasonal variations which are wider in some cases than in others. Broadly, it may be said that supplies from countries north of the equator are heaviest in summer. Thus, Danish imports gradually increase from the beginning of the year until June, and then steadily decline until the end of the year. The seasonal variation in Danish imports, however, is relatively small; supplies from Denmark are, in fact, more constant throughout the year than those from any other source. Receipts from the Irish Free State are relatively small in the first four months of the year and reach their maximum generally about July; the seasonal variation is much more marked than in the case of Danish imports. Imports from countries south of the equator—New Zealand, Australia and Argentina—also show wide seasonal fluctuations, but are at their lowest in the four months July to October and highest in winter. Imports from countries in the Southern Hemisphere thus account for very nearly two-thirds of the total in January but for less than one-fifth in July.

(d) **Import Duties Act, 1932.**—Butter is one of the commodities on which, under the Import Duties Act, 1932, a Customs duty of 10 per cent. *ad valorem* has been imposed as from March 1st, 1932. Butter from the Dominions, however, is exempted from the *ad valorem* duty and any additional duty until November 15th, 1932. The arrangements to come into force after that date in regard to imports from the Dominions will be the subject of discussion at the Ottawa Conference in July, 1932.

(e) **Consignments from Northern Ireland.**—There is some consignment of butter into Great Britain from Northern Ireland. In the 4 years 1927–30, however, the quantity so consigned averaged only about 40,000 cwt. per annum. An approximately equivalent quantity of imported butter is sent to Northern Ireland from ports in Great Britain.

(iii) Total Supplies.

(a) **Quantity.**—The following Table shows that, in the period 1924-7, the total quantity of butter available for consumption annually in Great Britain had increased by about 9 per cent. as compared with the pre-War supply.*

* The pre-War figures refer to the period 1905–9, the post-War figures to the period 1924–7. The increase in creamery butter production shown by the 1930 industrial census does not represent any considerable percentage increase in total supplies.

*Estimated Supplies of Butter available for Consumption in Great Britain before and after the War.**

—	Pre-War.		Post-War.	
	Quantity.	Percentage of total supply.	Quantity.	Percentage of total supply.
	Cwt.	Per cent.	Cwt.	Per cent.
Home Production ...	715,000	13	674,000	11
Net Imports†	4,839,000	87	5,379,000	89
Total Supply	5,554,000	100	6,053,000	100
Supply per head of population	15·8 lb.		15·4 lb.	

* From the "Agricultural Output and the Food Supplies of Great Britain" 1929.

† Allowance is made in "Net Imports" for movements of butter to and from Northern Ireland.

The contribution of the home industry to the total supply of butter is small; in the post-War period, the home output formed only one-ninth of the total and, in view of the large increase in imports during the past 4 years, it is almost certain that the proportion is now even less.

(b) **Value.**—The total value of all butter available for consumption in Great Britain in the post-War period is estimated at roughly £53,900,000 per annum, of which home-produced supplies comprised £6,800,000, while the value of net imports amounted to £47,100,000. Of the home-produced butter, the value of the farm-made output amounted to £6,300,000 and that of the factory output to £500,000.

(c) **Note on Consumption.**—In the two periods covered by the above Table, the average annual consumption of butter per head of population in Great Britain was between 15 and 16 lb. Imports, however, have risen substantially in the last few years and, on the assumption that home production has remained stationary, the consumption of butter per head of the population in 1931 was probably in the neighbourhood of 21 lb.

The consumption of butter has been maintained since before the War in spite of a marked increase in the consumption of other edible fats, in particular, margarine. The estimated annual *per capita* consumption of the latter commodity in Great Britain was 12·4 lb. in the post-War period, compared with only 5 lb. before the War; that is to say, the combined consumption of butter and margarine in the period 1924-7 is estimated at 27·8 lb. per head compared with 20·8 lb. in the 1905–9 period. Total supplies

of margarine in 1930* were approximately the same as in 1924, but there are indications that the considerable increase in butter imports and the low prices ruling on the butter market during 1931 caused a material falling-off in that year in the consumption of margarine, particularly the higher qualities, for domestic purposes†. Enquiries carried out by the Empire Marketing Board in Nottingham‡, for example, showed that in that city a decline in margarine sales of 19 per cent. occurred between July, 1928, and July, 1931, while butter sales increased by 15 per cent. during the same period.

CHAPTER II. DEMAND.

(i) General.

The annual consumption of butter per head of population in Great Britain in recent years is compared in the following Table§ with that in a number of other countries :—

Country.	Year.	Annual *per capita* consumption.
		lb.
Great Britain	**1924–7**	**15·4***
New Zealand	1927–9	34·05
Australia	1927–8	30·13
Canada	1929	29·95†
Denmark	1923	18·60
United States	1925	17·40
Netherlands	1923	15·00
Switzerland	1922	11·10
France	1923	10·90
Germany	1923	9·40

* The figure for 1931 was probably in the neighbourhood of 21 lb.—see Chapter I.

† In Canada, the production, importation and sale of margarine are prohibited.

Butter consumption in this country per head of population is thus about equal to, or, in some cases, considerably higher than in several European countries and the United States, but is much less than in the chief butter-producing Dominions.

* Fourth Census of Production. Preliminary Report No. 8. *Board of Trade Journal*, Mar. 31, 1932.

† "Our sales of margarine, especially of our best brands, were adversely affected last year by the extremely low prices prevailing for butter." Extract from speech by Sir James Martin, Chairman of the Maypole Dairy Co., Ltd., at the Company's Annual Meeting, 15th March, 1932.

‡ "Further Changes in the Demand for Butter," p. 9: E.M.B. Report No. 48, 1932.

§ With the exception of New Zealand, Australia and Canada, the source of the figures is the U.S.D.A. Statistical Bulletin No. 25, February, 1929. The New Zealand and Australian figures are taken from the respective Year Books, and the Canadian from the Dominion Bureau of Statistics' Monthly Bulletin of Agricultural Statistics, December, 1930.

Butter is regularly used at meals by all classes of consumers, though, in the case of the poorer consumers, margarine may be used instead. The demand for butter is more for spreading than for cooking, though, where incomes are higher, more may be used in the kitchen than at the table. The domestic consumer is notoriously fastidious in regard to butter and expects to receive the same kind continuously. There is very strong prejudice against change, sometimes even as regards the way the butter is made up.

Among the more well-to-do, the demand for butter is fairly steady irrespective of price. Demand as a whole, however, is very elastic. The need for fat in the diet can be met by several commodities, and since butter-fat is the most expensive of the fats ordinarily consumed, the demand for butter quickly responds to changes in the price of competitive fats and in the purchasing power of the public. Such information as there is suggests that consumption increases most rapidly when the retail price falls below about 1*s.* 2*d.* per lb.

With the development of margarine production during the present century, the demand for butter has become much more variable.

A certain amount of butter, generally of the poorer qualities, is still used for manufacturing purposes—for example, in the making of biscuits and toffee—and by bakers and confectioners, but for these purposes butter has been almost entirely displaced by substitutes (see below).

(ii) Local Preferences.

Home-produced farm butter seldom reaches the larger urban centres; a recent survey carried out by the Empire Marketing Board* showed that in Nottingham, for example, only 2 shops out of about 200 that were visited stocked English farm-made butter. It is mainly sold in the districts of production, or in adjacent areas, where a strong preference exists for this type of product. In Cornwall and Devon, for example, imported butter is despised as being "factory made." The preference for locally produced butter in the districts of production is not accounted for by cheapness, since the prices paid for local farm butter in the winter are relatively high. The farm product, when consumed fresh, as is possible in these districts, has a characteristic flavour which the imported article lacks.

In Wales, particularly in the rural districts, the consumer demands the high salt-content characteristic of Welsh butter which elsewhere is regarded as objectionable. Butter of this kind is said to be economical and, in view of the relatively heavy consumption of butter by manual workers, this is a strong argument in its favour. The proportion of salt varies from 3 per cent. up

* "Further Changes in the Demand for Butter." E.M.B. Report No. 48, 1932.

to as much as 10 per cent. in exceptional cases. The more heavily salted butter is in particular demand in the mining and quarrying districts of North Wales, where butter containing little salt is regarded as flavourless, insipid and comparable only with lard.

Generally, a paler butter seems to be preferred in the North to that demanded in the South.

Local preferences, as regards imported butter, owe their existence to distributive arrangements. The main markets for each type of butter tend to be grouped round the ports of entry (see Table III, page 147). Butter is imported into the United Kingdom through three main channels—viz., Australian and New Zealand butters chiefly through London, Irish butter through the west-coast ports, and European butters, particularly Danish, through the ports on the east coast.

A survey* carried out by the Empire Marketing Board shows that New Zealand butter is most frequently stocked in the south and, in the earlier months of the year, in Liverpool. London is the main market for Australian butter, which, like New Zealand butter, is stocked to a less extent in the North and East.

Irish butter, which is not available in quantity till June, finds its main market in the West, though it is stocked by a fair number of shops in London. In South Wales, it is by far the commonest butter in its season. In Liverpool, it holds a position comparable with Danish, and in Glasgow it is second to Danish. Many retailers who stock Irish butter change over to New Zealand or Australian in the winter months.

Danish† butter is the staple type in the North and East—in the large consuming areas of Lancashire, Yorkshire and Scotland, for example. In Liverpool and Birmingham, it is about equal in popularity to overseas Empire butters, but in London, Bristol and South Wales, it is much less commonly sold.

Argentine butter is stocked chiefly in London and Birmingham; Siberian, chiefly in Birmingham and Bristol; Swedish and Finnish in the north; and Dutch and French in London.

European butter, being packed in casks, can be differentiated on the counter by the shape of the lump from that from the Southern Hemisphere, which arrives in boxes. Moreover, the colour of European butter tends to be lighter.

The retailer plays a highly important part in determining the kind of butter that is bought. The Empire Marketing Board, in consequence, in 1931, carried out an intensive canvass of retailers in the north of England, with the object of inducing those who were not already doing so to sell butter of Empire origin. It is impossible to judge whether this has had a permanent effect on the amount of Empire butter sold in that area, though subse-

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* "The Demand for Empire Butter," E.M.B. 34, 1930.

† The term "Danish" is sometimes applied in the trade to any butter imported in casks as distinct from boxes.

quent enquiry showed that within a short time of the canvass many more retailers were stocking it. A permanent increase in demand would probably require a more prolonged sales effort.

Consumers in the South prefer a rather less salted butter than those in the North, and some prefer entirely unsalted butter. The demand for packeted butter is increasing throughout the country, particularly in the South and West.

(iii) Influence of Season and Quality.

(a) **Season.**—Though there is a slightly higher consumption of butter in the winter than in the summer, the seasonal variation in demand is very small. In the colder weather, butter is more difficult to spread and consequently more of it is used, but this is largely offset by the fact that, in very warm weather, butter is softer and tends to "soak into the bread" more readily.

(b) **Quality.**—Other things being equal, higher-quality butter will always tend to replace the inferior article. The consuming public is very sensitive to changes in the quality of butter or in characteristics, such as colour, which are regarded as indications of quality. Thus, the highly coloured Southern Hemisphere butter when it comes on to the market in quantity in the late autumn tends to be regarded with suspicion by the consumer, and this leads annually to a temporary check in demand.

(iv) Butter Substitutes.

The use of butter substitutes may be considered in relation to manufacturing purposes, domestic cooking and table use. For manufacturing purposes, butter has now very largely been replaced by substitutes. Before the introduction of margarine and various vegetable fats, butter was widely used by bakers and confectioners in the making of cakes and pastry, and by toffee and biscuit manufacturers, but, though it is still used for these purposes to some extent, its use is now mainly confined to the production of goods of specially high quality. In the kitchen, butter may be replaced by margarine and, to a less extent, by lard and dripping. For table purposes, butter is less often replaced by substitutes; margarine is the substitute generally adopted by people of small means.

Note on Margarine.—Margarine was invented in 1869 by a French chemist, Mege-Mouriez, at a time of scarcity of edible fats in Europe, and earned for the inventor the prize offered by Napoleon III for the invention of a satisfactory substitute for butter. The specification of the patent registered in England on July 17th, 1869, was as follows :—

"A fatty body, identical in chemical composition with butter, is obtained from fresh suet by crushing it between rollers under a stream of water, further washing it, and then digesting it with artificial gastric juice. The fat is extracted, melted, passed through a sieve, and poured into boxes to set, after which it is cut into pieces which are wrapped in cloths and pressed between hot plates. A fatty body is expressed, and may be agitated in a closed vessel,

cooled, cut up, bleached with acid, and washed with water. This purified fat is mixed at animal heat with water containing small quantities of bicarbonate of soda, casein of cold milk, and mammary tissues, along with yellow colouring matter. This is digested, allowed to settle, decanted, and cooled, and yields a preserved butter. Fresh butter is obtained by agitating the above mixture until a cream is formed, which is then treated as usual to obtain the butter."

The quality of margarine varies according to the kind of fats from which it is made ; the cheapest is made mainly from vegetable oils extracted from such products as copra, palm kernels, peanuts, soya beans and cotton seed ; the most expensive is made from animal fats.

Manufacturers receive the fats already refined. The solid fats are first melted separately in steam jacketed vats at temperatures only slightly above the melting point ; the quantity of soya fat or oil required to secure the desired blend is then mixed in, and the whole is heated to a temperature of about 30° C. To obtain a flavour as nearly like that of butter as possible, the mixture of fats and oils is churned with sour skimmed milk. The liquid mass is then discharged against a strong spray of ice-cold water. This solidifies the fats, and the now solid material is worked on an ordinary butter worker to express excessive moisture and to give a uniform consistency.

Butter is regarded by most consumers as more palatable than margarine, though the best qualities of margarine closely resemble butter in taste. Butter-fat is only slightly more digestible than the fats contained in margarine. Margarine is deficient in vitamin A, but endeavours are being made to overcome this deficiency. It is doubtful, however, how far the relative food or health values of the two commodities weigh with the majority of consumers.

The consumption of margarine in this country has increased very rapidly since pre-War days. It is estimated that the average annual supply available for consumption in Great Britain in the period 1905–9 was about 1,700,000 cwt. (5 lb. per head of population) compared with about 4,900,000 cwt. (12·4 lb. per head) in the period 1924–7. It is probable, however, that margarine consumption fell off in 1931 on account of the increased imports and low prices of butter.

CHAPTER III.—PRICES.

(i) Trend.

Diagram B shows, for the years 1904–14 and 1922–31, inclusive, the annual average wholesale prices of English (farmhouse), Danish, New Zealand, Irish and Argentine butters.

Before the War, prices were relatively steady, with a definite though slight tendency upwards, the rise in most kinds of butter having been about 20 per cent. during the period 1904–14. Prices

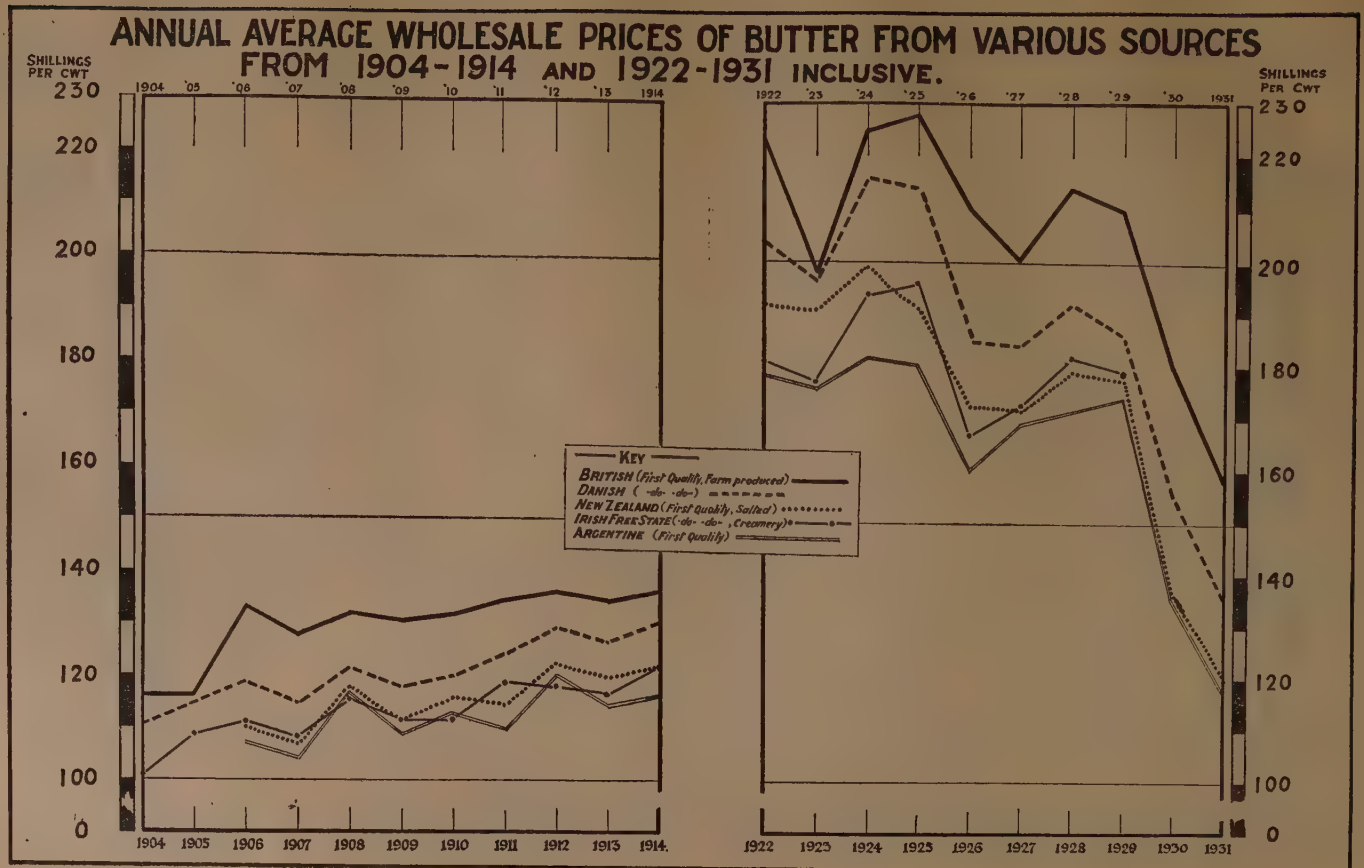

ANNUAL AVERAGE WHOLESALE PRICES OF BUTTER FROM VARIOUS SOURCES
FROM 1904-1914 AND 1922-1931 INCLUSIVE.
SHILLINGS PER CWT
230
220
200
180
160
140
120
100
0
1904 '05 '06 '07 '08 '09 '10 '11 '12 '13 1914
1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914.
1922 '23 '24 '25 '26 '27 '28 '29 '30 1931
1922 1923 1924 1925 1926 1927 1928 1929 1930 1931
KEY
BRITISH (First Quality, Farm produced)
DANISH (-do- -do-)
NEW ZEALAND (First Quality, Salted)
IRISH FREE STATE (-do- -do- , Creamery)
ARGENTINE (First Quality)

DIAGRAM B.

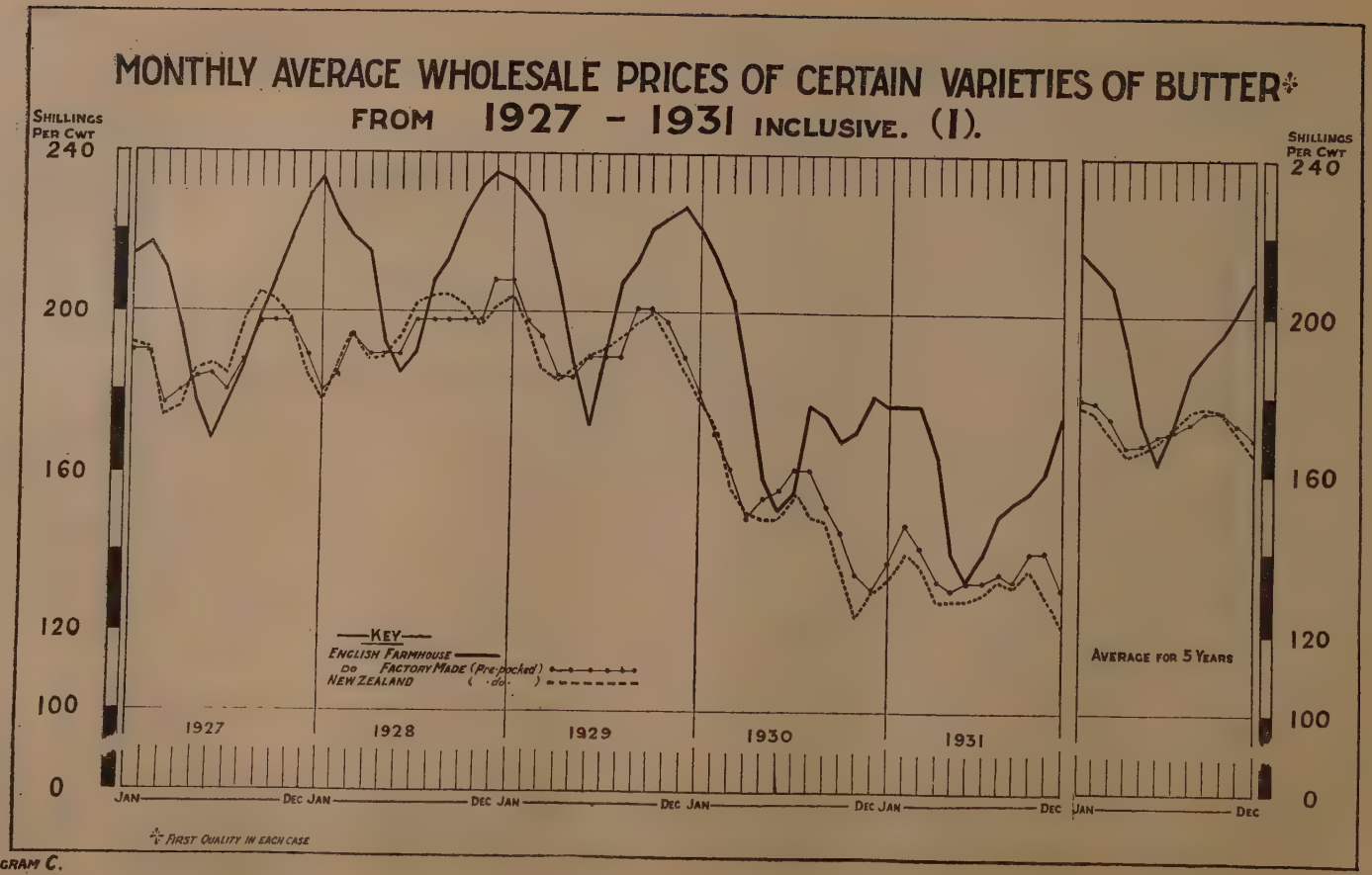

MONTHLY AVERAGE WHOLESALE PRICES OF CERTAIN VARIETIES OF BUTTER*
FROM 1927 - 1931 INCLUSIVE. (1).
SHILLINGS PER CWT
240
200
160
120
100
0
KEY
ENGLISH FARMHOUSE
DO FACTORY MADE (Pre-packed)
NEW ZEALAND (do.)
1927
1928
1929
1930
1931
AVERAGE FOR 5 YEARS
JAN DEC JAN DEC JAN DEC JAN DEC JAN DEC JAN DEC
* FIRST QUALITY IN EACH CASE

DIAGRAM C.

immediately after the War were, of course, at a much higher level. Since then, prices have fluctuated widely but have, on the whole, declined very considerably, and by 1931 they almost reached the pre-War level. The highest prices since 1922 were attained in 1924 and 1925. There was a sharp fall in 1926, followed by a gradual recovery until 1928 and 1929. A rapid decline began in 1930.

The price movements of butter during the present century have largely reflected the course of commodity prices generally. From 1926 to 1929, however, butter prices, like those of cheese, showed a slight rise at a time when both the general and the agricultural price index were falling considerably. There is, of course, a close relation between the trend of butter and cheese supplies and prices over long periods. During the period 1926–9, imports of dairy produce generally, including both butter and cheese, were approximately stationary. Canadian cheese exports were diminishing rapidly and thus counteracting the effect of expanding milk production in New Zealand. Since 1929, however, the fall in butter prices has been far more abrupt than in those of cheese or of agricultural commodities in general. Thus, in November, 1929, 1930 and 1931, the price-index numbers of butter, cheese and agricultural produce generally, compared with the average of the corresponding months in 1911–3, were as follows :—

	Butter Index Number.	*Cheese Index Number.*	*Agricultural Index Number.*
November, 1929 ...	150	132	144
„ 1930 ...	110	116	129
„ 1931 ...	105	106	112

This fall may be correlated with the rapid increase in imports of butter during these years, mainly from New Zealand, Australia and Denmark (see Chapter I).

The relation between the trend of butter and cheese prices, arising from the ready interchangeability of methods of disposal of world milk supplies, was discussed in the Report on cheese marketing.*

(ii) Seasonal Variations.

Diagrams C and D illustrate the monthly course of wholesale prices of first-quality English farmhouse butter, English factory butter, New Zealand packet butter and of Danish, New Zealand and Argentine bulk butter, in the five years 1927–31, together with the average for the whole period. The seasonal movement of prices is more or less similar in all cases, though there are, of course, individual variations from the general seasonal trend. Prices are generally at their maximum in the winter months and at their minimum in the summer. The prices of butter from

* Economic Series No. 22, p. 43 and Diagram C.

different sources, however, do not reach their highest and lowest points at exactly the same seasons.

The prices of home-produced butter, particularly those of farm butter, vary more widely than those of imported kinds. The peak generally occurs at Christmas-time and the price then declines gradually for about two months, subsequently dropping steeply until early in June. An upward movement then sets in which is at first rapid, and then more gradual, until the end of the year.

With imported butters, the minimum price is usually reached earlier in the year than in the case of home supplies. With Danish, it occurs about May and June, prices afterwards increasing rapidly until October or November and remaining relatively high until February. With Southern Hemisphere butters, the lowest prices occur from about March to June, the highest from August to November. In all cases, the seasonal movements of prices reflect the variations in total imports, which are, on the whole, lowest in winter and highest in June and July. To a less extent, variations in the volume of supplies from individual sources also influence the prices of supplies from those sources. In the case of the home farm-made product, in particular, which enjoys a more or less independent market, the price is influenced to a notable degree by variations in the supply of that product as distinct from butter supplies in general.

(iii) Local Variations.

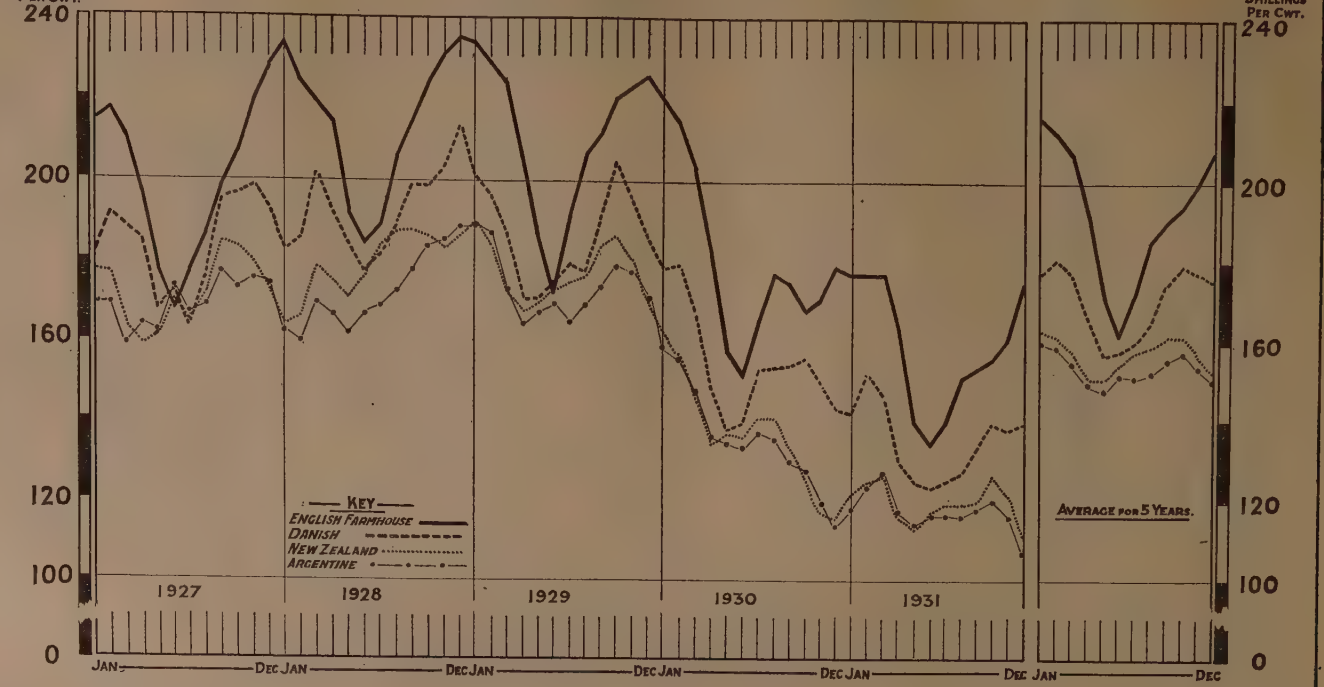
There are marked variations in the price of home-produced farm butter from one market to another. Diagram E shows the average monthly prices of first-quality butter at Dorchester, Penzance, Skipton and Welshpool markets, which may be regarded as typical of prices ruling in several of the principal butter-producing districts. A more or less constant margin is maintained between prices at these four markets, those at Dorchester being generally highest, followed by those at Skipton, Penzance and Welshpool. These margins may no doubt be attributed, to some extent, to differences in the meaning of the term " first quality " in the various markets, but they are also due to differences in the type of business mainly transacted, whether buyers are dealers purchasing for distant markets, or local retailers.

Higher prices are usually realized for farm butter in the smaller country towns than in the larger towns. The difference may be as much as from 2*d*. to 4*d*. per lb. and reflects the strong preference of country consumers for the farm-made product.

(iv) Quality Differentials.

At country markets, prices are quoted for first and second-quality butter. The difference in price between the two qualities however, varies widely in different markets, partly because, in the absence of recognized quality grades, the prices often do not refer to comparable produce. The range of prices also varies with the

MONTHLY AVERAGE WHOLESALE PRICES OF CERTAIN VARIETIES OF BUTTER*
FROM 1927-1931 INCLUSIVE. (II)



* FIRST QUALITY IN EACH CASE.

DIAGRAM D.

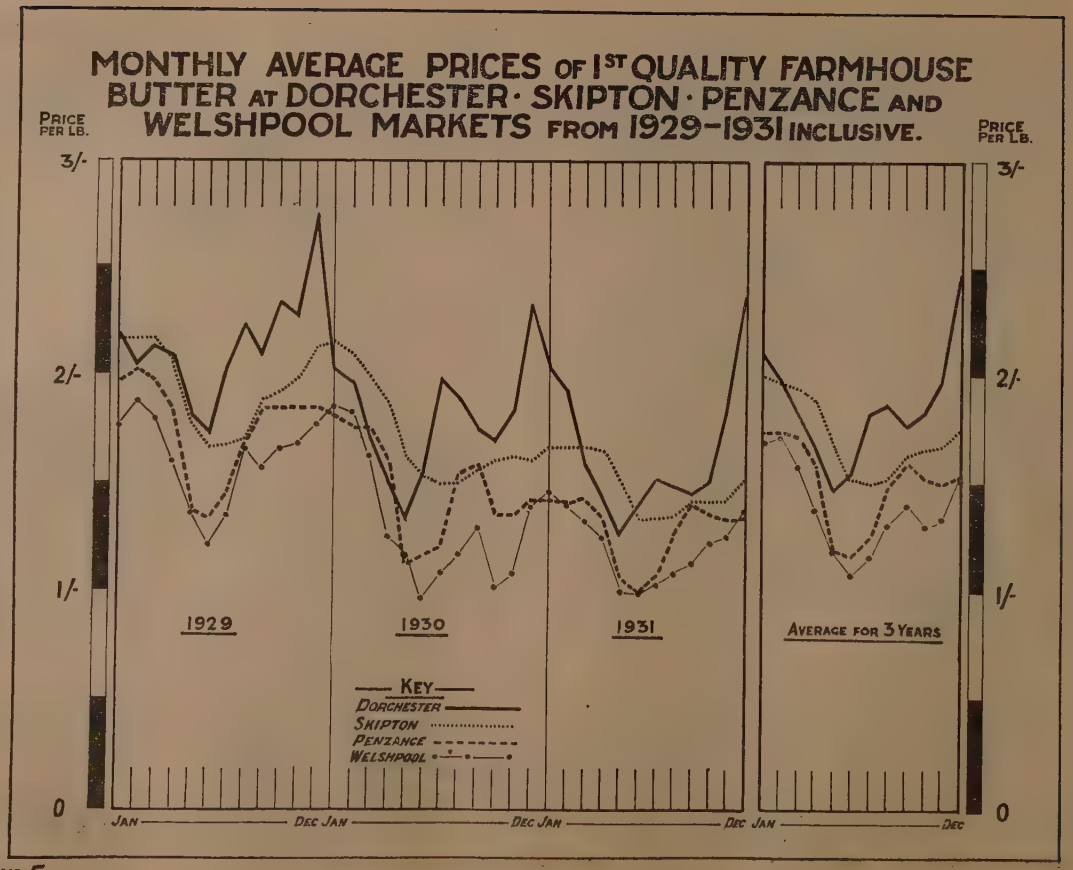

MONTHLY AVERAGE PRICES OF 1ST QUALITY FARMHOUSE BUTTER AT DORCHESTER · SKIPTON · PENZANCE AND WELSHPOOL MARKETS FROM 1929–1931 INCLUSIVE.
PRICE PER LB.
PRICE PER LB.
3/-
2/-
1/-
0
1929
1930
1931
AVERAGE FOR 3 YEARS
KEY
DORCHESTER
SKIPTON
PENZANCE
WELSHPOOL
JAN
DEC JAN
DEC JAN
DEC JAN
DEC

DIAGRAM E.

kind of lots generally offered. In one market, for example, the lots may be generally small and competition for the few pounds from a particular dairy may force up the top price, while supplies from a maker who only sends in butter that he cannot sell at the farm door may realize a low price because it is only a casual supply and may be in poor condition ; prices in such a market may range from 1*s.* 3*d.* per lb. for top quality down to 8*d.* for the lowest. In another market, where the lots are larger and all the senders are regular suppliers, the price-range may be much narrower.

Another factor making for variations in quality differentials as between different markets is the type of buyer who generally attends. Where buyers are mainly wholesalers or blenders or their agents, as is the case in markets where parcels are large and supplies regular, the price-range is small. In markets where the parcels are small and where the buyers consist of consumers and small retailers, together with a few dealers who buy any small quantities left over, a wider range of prices is to be expected.

Where butter is purchased by the dealer direct from the farm, it is usually paid for at a flat rate ; it is frequently bought only as a means of making sure of the farmer's supplies of eggs (see Chapter VIII).

(v) Varietal Prices.

Diagrams C and D show that the wholesale prices of home-produced farm butter in winter rule from 30*s.* to 40*s.* per cwt. above those of Danish—the highest-priced imported. In summer, on the other hand, the price of the home product may fall as low as or even lower than that of Danish.

Of the principal imported butters, Danish realizes the highest price, followed by Irish creamery and New Zealand, and then by Australian and Argentine. The margin between Danish and New Zealand prices averages about 10*s.* per cwt., varying from as much as 20*s.* in the last quarter of the year to only a few shillings about June and July. Irish and New Zealand butters realize, on the average, about the same prices, Australian and Argentine 2*s.* or 3*s.* per cwt. less.

It was pointed out, in the Report on the marketing of cheese,* that the price level of home-produced cheese depends on that of imported cheese over long periods, owing to the high ratio of imported to total supplies. Diagram B (page 27) indicates that a similar relation exists in the case of butter, where the proportion of imported supplies is even higher. Short-period price movements of home-produced farm butter, however, are largely independent of those of imported. The two products supply distinct markets. Home-produced butter is found only rarely and in insignificant quantities in the large consuming centres, which depend on imports for their requirements. The prices of the two products are, therefore, governed to a considerable extent by independent conditions of

* Economic Series No. 22, p. 43.

supply and demand. Home-produced creamery and factory butters supply the same markets as imported, and the fluctuations in their prices follow with some regularity those of imported butter; but they usually realize a somewhat higher price than imported kinds and the differential tends to be wider in the winter.

(vi) Retail Prices.

Reliable and comprehensive information as to the retail prices of butter is not available. Apart from trade advertisements, the only retail prices published are those used by the Ministry of Labour in computing the monthly index figure of the retail prices of food and published monthly in the *Ministry of Labour Gazette*. In these quotations, distinction is made between fresh and salt butter. The prices, however, are averages of various sorts and do not purport to refer to butter from any particular source. They cannot, therefore, be related specifically to any of the wholesale prices already mentioned; but they do give some indication of the general level of retail prices and the variations to which they are subject.

Retail, like wholesale, prices fluctuate more or less regularly from the maximum reached around Christmas to the minimum at midsummer. Fresh butter commands a premium over salt butter of slightly more than a penny per lb. on the retail price.

The average margin between wholesale and retail prices was found by the Linlithgow Committee in 1923 to be about 11 per cent. on the retail price.* With the considerable drop in prices that has since occurred, the percentage margin, as would be expected, now appears to be somewhat wider; but there is no reason to believe that the actual margin—about 2*d*. per lb.—has increased.

(vii) Market Intelligence.

Prices of British fresh dairy butter, of first and second qualities, at some 20 to 25 country markets in England and Wales are quoted weekly in the Ministry of Agriculture and Fisheries' *Agricultural Market Report*, which also gives the quantities on offer at a few of the chief markets where butter is sold. The price quotations are necessarily subject to considerable qualification because of the different kinds of transactions to which they may refer. Thus, small lots may be purchased by consumers and such transactions, though incorporated in market reports, are not true indices of wholesale prices. Wholesale transactions may be between the farmer and the dealer, between the farmer and the retailer or between the dealer and the retailer. Moreover, different prices are paid for bulk butter for blending and for butter made up ready for retailing; the differential is usually about 1*d*. per lb. in favour of the latter.

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* Cmd. 1854/1923, p. 64.

The *Agricultural Market Report* also quotes, according to season, prices of Irish creamery (salted and unsalted), Irish factory, Australian and New Zealand (salted), Argentine, Danish, Dutch and blended butters at Bristol, Liverpool and London. Prices are given for two qualities. These prices represent transactions between wholesalers and retailers. A brief statement of trade tendencies at these three ports is also given.

The *Weekly Dairy Produce Notes*, issued by the Empire Marketing Board, give a very full account of both supplies and prices for imported butter as well as for other dairy produce. The total supply position is outlined weekly and figures are given of weekly arrivals both in total and at individual ports, as well as expected arrivals during the two coming weeks, and shipments afloat from Australia, New Zealand and Argentina. A detailed weekly account is also given of the supply position in the principal countries exporting butter to the United Kingdom ; the information given includes production and stocks in cold-storage in the Irish Free State, weekly receipts into store and total monthly gradings in New Zealand, as well as shipments from New Zealand, weekly gradings and exports of Australian butter, exports from Denmark, Estonia and Latvia to this and other countries, and shipments from South Africa and Argentina. Particulars of stocks of butter in cold-storage in this country are included fortnightly ; these figures are not entirely complete but are estimated to cover 95 per cent. of the supplies in cold-store.

The prices given in the *Weekly Dairy Produce Notes* are those issued by the London Provision Exchange and include, in season, New Zealand, Australian, Irish (creamery), South African, Argentine, Danish, Dutch, Estonian, Latvian, Polish, Lithuanian and Russian. Weekly average prices of British creamery and blended butters, as supplied by the English Butter Makers' and Butter Blenders' Association, are also published.

The prices issued weekly by the London Provision Exchange for numerous kinds of imported butter are also published in the provision trade periodicals.

PART II—PREPARATION FOR MARKET.

CHAPTER IV.—QUALITY.

(i) Quality Characteristics.

(a) **Flavour.**—The most important quality feature of butter is its flavour. Flavour cannot be accurately defined—a fact which has led to the use of the scoring method (see Chapter V) as a means of assessing the merits of different samples. Such terms as "rancid," "insipid," "lardy," "tallowy" and "fishy" are more or less self-explanatory, but terms such as "choice," "strong," "weak," "flat," "fine" and "good" are only fully significant to experts.

There are several well-recognized defects of flavour. Some of them can be traced to the surroundings or contacts of the milk, the cream or the butter itself, others to the action of bacteria or moulds and others to the food eaten by the cows.

There is some risk of butter absorbing taints if it is placed in proximity to strongly odorous goods such as fish, paraffin or onions. Similarly, an objectionable flavour may be imparted by the packing material, especially if care is not exercised in lining and filling the containers. Wood-taint, for example, is not unusual. A more common fault, however, particularly in imported butter, is deterioration of flavour through storage at too high temperatures, bad stacking or poor ventilation (see Chapter XIV). Little home-produced butter is kept in store for any length of time, so that off-flavours do not often arise from these causes; on the other hand, it generally travels such a short distance to its market that little attention is given to packing and it may, in consequence, suffer through exposure, handling or contact with other produce.

(b) **Texture and Body.**—The term "texture" refers to the "grain" that is shown when a block of butter is broken across; the "body" is its consistency as judged by the "feel." Texture and body are indications of the efficiency of manufacture. Thus, faulty churning and inadequate working are both reflected in the texture and body of the finished product. The feeding of the cows producing the milk from which the butter is made has also a considerable influence on its consistency. In blended butter, of course, the process of re-working greatly modifies the original texture.

From the consumer's standpoint, texture and body are not of great importance. All that is required is that the butter should be easy to spread without being greasy. The popularity of blended butter is to some extent due to its "spreadability," which is an incidental effect of blending.

(c) **Colour.**—Butter has a natural colour which varies according to the breed and the feeding of the cows producing the milk. The colour ranges from almost white to a deep yellow. Certain districts, such as Cornwall and the Isle of Wight, have developed a preference for highly coloured butter, chiefly due to the large number of Channel Island cattle in these areas. Apart from the shade, the colour should be uniform and not cloudy or mottled.

Faults in colour are of two kinds—viz., unevenness in single samples and lack of uniformity over a period. Uneven colour, whether mottled, streaky or dirty, arises from such causes as under-working, uneven salting, inadequate washing and careless packing, and seriously detracts from value. It is also important that butter should not vary in colour from time to time. The consumer requires a butter of unchanging colour throughout the year. Lack of uniformity in consignments has an adverse effect on demand. It is not always easy, however, for the producer to maintain an even-coloured butter at all seasons, for changes in the feeding of the cows—such as the change from pasture to stall-feeding—influence the colour of the butter. It is possible, however, to make good a deficiency in colour by adding colouring matter in the form of annatto ; the use of artificial colouring has thus tended to sustain and even create local preferences. Uniformity of colour is one of the advantages obtained by blending.

(d) **Moisture Content.**—The normal range of moisture-content in butter is from 14 to 16 per cent., though butters with as little as 12 per cent. or as much as 20 per cent. are met with. It is only in farm butter, however, that the moisture-content often rises above 16 per cent. The effect on general quality of variations in moisture-content within the maximum permitted by law in this country (see page 00) is negligible ; in consequence, it is to the interest of the producer to incorporate the full amount of moisture permitted. Drier butter tends to keep rather better, but if butter is well made and properly stored, it should not be necessary, for this reason alone, to incorporate less water than is allowed by law.

(ii) Influence of the System of Production.

(a) **Farm Butter-making.**—The original quality of butter is largely determined by the conditions under which the milk is produced, by the treatment and ripening of the cream, and by the technique of manufacture—that is to say, by factors that are within the control of the butter-maker, always provided that the butter-maker supervises the whole process right from the production of the milk. The farm butter-maker can do this, but the manufacturer of creamery butter, particularly if he buys ripened cream and not milk, has direct control only over a part of the process. The superiority of the best farm butter is, in fact, largely due to this personal control of all the factors that determine quality.

Unfortunately, however, the quality of much of the farm-made butter in this country is low. On most butter-making farms, butter is of such minor importance in the farm economy that conditions essential to high-quality production, particularly those associated with the production and handling of the milk before it reaches the dairy, are frequently neglected. Butter-making is often only incidental to cow-keeping. The farmer's main concern is to obtain separated milk for calf-rearing or pig-feeding, and manure for his land. Moreover, as the money realized from the sale of butter on many farms is kept by the farmer's wife to meet household expenses, the farmer does not generally concern himself with the quality of the butter made in the dairy. The best efforts of the butter-maker to produce a high-quality article are, however, useless if attention is not given in the cowshed to the production of clean milk, uncontaminated with bacteria, which have an adverse effect both on the ripening of the cream and on the quality of the butter. Frequently, also, negligent methods prevail, both in the cowshed and in the dairy. Much of the butter is made on small farms where accommodation and equipment are deficient. Poor cowsheds, lack of suitable storage accommodation for the cream, of a cold-water supply or refrigeration plant, and of efficient butter-making equipment, make it impossible to produce a well-flavoured, good-keeping butter, and if to these conditions are added unskilful and careless methods, a product of very low quality is bound to result. In addition, marketing is unorganized and there is thus no pull, from the marketing end, to draw forth a high-quality article in regular quantities.

Much valuable work has been done, during the past 50 years, to improve the standard of farm butter production in this country by technical education. Instruction in butter-making forms an important part of the dairy education facilities provided by County Councils and in the various institutions for agricultural education. But the number of butter-making farms is so great that it is impossible, in the nature of things, for the effects of educational measures to reach more than a comparatively small proportion of the butter-makers.

Education cannot, in any case, alter the fact that there is bound to be wide diversity of product, both from one farm to another and in successive consignments from the same source. That there should be differences in the product obtained from different farms is inherent in the farm butter-making system. The nature of the soil and the pasture, the breed of cow kept, the technical skill of the butter-maker, the type of equipment, the nature and adequacy of the water supplies and the facilities for temperature-control, all influence the quality and character of the butter produced, and they differ widely from farm to farm. Changes in weather conditions, in domestic arrangements and in the state of the raw material similarly militate against uniformity in successive supplies from any one source. In the satisfaction

FIG. 2.—Combined churn and butter worker.

FIG. 3.—Cream ripening vats.

FIG. 4.—Delivery of milk to creamery.

FIG. 5.—Delivery of farm-separated cream to creamery.

FIG. 6.—Travelling cream separating unit (Germany).

FIG. 7.—Sorting imported bulk butters for blending.

FIG. 8.—Blending factory: slicing machine and rotary butter-working table.

of consumer-demand, uniformity is as important as high quality, for although some consumers are willing to buy low-priced butter, provided it is uniform in quality and type, most people are dissatisfied if the butter sold to them is variable in quality, even though some of it reaches a high standard. Uniformity is essential not only in flavour but also in colour and texture, and the consumer is often suspicious even of changes in the make-up.

(b) **Creamery Butter Manufacture.**—There are two types of centralized butter manufacture in this country—(*i*) the creamery system of manufacture from purchased milk or cream (Figs. 2 and 3), and (*ii*) the blending system, where farm butters are mixed together, frequently with imported butter (Figs. 7 and 8). Combined creameries and blending factories also exist where imported butter is blended with that made from locally produced cream. This is done chiefly to maintain output in the season of short milk supplies.

One of the main advantages of either type of manufacture is that variations in the original supplies of raw material, whether milk, cream or butter, are submerged in the process of manufacture and a uniform article is obtained. Moreover, as centralized manufacture implies a limited number of manufacturing units, standardization of quality on a national scale becomes attainable. Creameries that produce butter are of two kinds—viz., those that purchase milk (Fig. 4) and those that buy cream separated on the farm (Fig. 5). The degree of concentration of the milk supplies available for manufacture and the efficiency of local transport facilities mainly determine which system is operated. In general, it may be said that, with good road communications, a distance of 4 miles is the maximum desirable for regular daily deliveries of milk. If supplies are not sufficiently concentrated to ensure an economic daily throughput within this radius, or if the nature of the surrounding country makes it difficult and costly to transport milk even for this distance, two alternatives are open —viz., either cream separated at the farm may be collected or delivered to the creamery two or three times a week, or the creamery may set up separating stations in the surrounding districts to act as its "feeders."

The manufacture of butter in creameries from purchased milk, which is the method prevailing in Denmark, is the system most suited to give a product of high and uniform quality. The raw material is received fresher and the minimum of responsibility for quality-control is left with the farmer. In addition, in most countries where this system prevails, the milk is tested on entering the creamery for sweetness, as well as butter-fat, and milk that is obviously unsuitable can be rejected. The milk can be separated and the cream pasteurized before any considerable bacterial development has taken place, and the temperature can be properly controlled until the cream is churned.

The "separating station" system gives all the advantages in

respect of quality-control that are attainable by the delivery of milk direct to the creamery, and has the additional advantage that it obviates long-distance haulage of milk to the creamery and of separated milk back to the producer. This system is common in Ireland. In Germany, experiments are being made with travelling separating stations, the separator being mounted in a motor-van that goes from farm to farm twice a day (Fig. 6).

The farm collection of cream or the delivery of farm-separated cream for butter-making is common in New Zealand, Australia, Canada, South Africa and Argentina, where it is the method best suited to local production conditions. It has also been adopted, to some extent, in the main butter-producing districts of England and Wales, where, owing to the fact that many farmers still make their own butter, a comparatively wide area has to be drawn upon for raw material, even though milk production is highly concentrated.

It is more difficult to ensure high quality and uniformity under this system. A longer time elapses before the raw material comes under the control of the creamery, and more therefore depends on the conditions on the farm where the cream is separated. Much harm can be done to the cream if the separators are not thoroughly and effectively washed and sterilized after each use. The farm should have adequate supplies of cold water to cool the cream after separation, and suitable storage accommodation for it until delivery to the creamery. The treatment of the cream during storage on the farm is also important ; it must be frequently stirred in order to aerate it and prevent a stale flavour from developing, it must be protected from dust and flies, there must be proper ventilation and it must be kept away from odorous substances. Some system of inspection of the farms supplying the cream is, therefore, desirable under this system if the quality of the supplies is to be satisfactory. The grading of cream on arrival at the creamery and payment for it on a grade basis are measures that have been generally adopted in other countries to ensure the necessary care and cleanliness on the part of the farmer.

In the chief butter-producing countries, the importance of technical skill in securing high quality is fully realized. Facilities are available in dairy colleges for the training of factory managers and butter-makers. Government research stations investigate problems concerning quality that arise in the manufacture, storage and shipment of dairy produce. At agricultural shows and dairy trade exhibitions, competition classes are included for creamery butter. In many countries, it is a requirement that the butter-maker at each creamery should hold an official certificate of proficiency. In some cases, also, the manager of every creamery is required to be certificated.

(c) **Cream Grading.**—The grading of cream collected from farms or delivered by producers to creameries for butter-making has been made compulsory in some countries as a means of maintaining high and uniform quality.

Cream grading consists simply of assessing the quality by smell and taste and determining the butter-fat content by analysis. Simple though the former operation appears, it requires considerable experience and skill if it is to be carried out satisfactorily. In consequence, in countries where cream grading is compulsory, it is customary to require persons entrusted with the grading to be officially certificated. The State maintains an inspection service to see that the grading is efficient, and a grader's certificate is promptly revoked in the event of incompetence.

New Zealand.—In New Zealand, by regulations under the Dairy Produce Act, 1908, all cream intended for delivery to a manufacturing depot must, immediately after separation, be cooled to a temperature of not more than 65°F., and must, at all stages before manufacture, be adequately protected from the sun. Whey cream, immediately after separation, must be heated to a temperature of not less than 176°F. and forthwith cooled to, and kept at, a temperature not exceeding 65°F.

On delivery at the creamery or whey-butter factory, the cream or whey cream, as the case may be, must be graded as soon as practicable, and in any case not later than 3 hours after its arrival, and each grade must be paid for at a differential price. Three grades are prescribed for cream—"Finest," "First Grade" and "Second Grade"—and two grades for whey cream—"First Grade" and "Second Grade." In the South Island, a different classification is used during June to September inclusive, when there are two grades only for cream—"First Grade" and "Second Grade." The definitions of the different grades are as follows :—

Product.	Designation.	Standard.
Whole-milk Cream.	Finest.	Clean in flavour, of uniform consistency and free from appreciable defects in all other respects.
	First Grade.	Almost clean in flavour, of uniform consistency and free from serious defects in all other respects.
	Second Grade.	Below First Grade quality, but suitable for the manufacture of butter for human consumption.
Whey Cream.	First Grade.	Of a quality which yields first-grade whey butter.
	Second Grade.	Of a quality which yields whey butter.

The rate of payment for "Finest" cream must be at least ½*d.* per lb. of butter-fat above that for "First Grade," and that for "Second Grade" cream or whey cream at least 1*d.* per lb. of butter-fat less than that for "First Grade." No minimum butter-fat content is prescribed for any of these grades, but it is provided that cream containing less than 35 per cent. by weight of butter-fat shall be paid for at a rate at least ½*d.* per lb. of butter-fat less than that payable for cream of that grade.

Every cream grader is required periodically to forward to the Director of Agriculture a return of all cream graded by him as "Second Grade," with details as to the creamery where it was graded and the supplier of the cream.

Cream of a quality too low for inclusion in "Second Grade" is regarded as unfit for the manufacture of a product for human consumption, and to prevent its subsequent use for that purpose it is required to be coloured by the addition of methyl violet.

Australia.—In Australia, cream grading is compulsory and is carried out on lines similar to those of the New Zealand system, though four grades are in use—viz. "Choicest," "First," "Second" and "Third." Cream of different grades may not be mixed for manufacturing, and the boxes in which the butter is packed must be marked with an indication of the grade of cream from which it was made.

Canada.—When the introduction of hand separators led to the delivery to creameries of farm-separated cream instead of milk, measures were introduced to check the anticipated falling-off in the quality of the butter. With this object, cream grading was adopted, at first voluntarily, in Saskatchewan and Alberta early in the present century. Its effect was quickly appreciated and it was later made compulsory in successive Provinces; grades were prescribed and price differentials fixed for the different grades. As an example of the cream-grading regulations in force in Canada, the Dairy Produce Act, 1930, of the Province of Ontario decrees that "all cream used in the manufacture of butter shall be graded at a creamery and payment for the cream shall be based on such grades." Four grades have been prescribed under this Act—viz. "Special Grade," "First Grade," "Second Grade" and "Off Grade." The definitions of these grades are as follows:—

> *Special Grade.*—This grade shall include any lot of cream which is clean in flavour, of uniform consistency and fit for making into Special Grade butter. The acidity of cream in this grade shall not be more than thirty hundredths of one per cent. (0·30 per cent.) at the time of being graded at the creamery where it is to be manufactured into butter.
>
> *First Grade.*—This grade shall include any lot of cream which is reasonably clean in flavour, of uniform consistency and fit for making into butter of this grade. The acidity of cream in this grade shall not be more than sixty hundredths of one per cent. (0·60 per cent.) at the time of being graded at the creamery where it is to be manufactured into butter.

Second Grade.—This grade shall include any lot of cream that does not meet the requirements specified for the next higher grade—such as cream which is bitter, stale, musty, metallic or otherwise unclean in flavour.

Off Grade.—This grade shall include any lot of cream with a very objectionable odour or flavour such as kerosene, gasoline, stinkweed, onions or such other flavours as may render cream unfit for making into Second Grade butter.

South Africa.—In South Africa, cream grading to statutory grades was established compulsorily under the Dairy Industry Control Act, 1930, the statutory grade designations being "First Grade," "Second Grade," "Third Grade" and "Below Grade." Cream for butter-making must be tested within 3 working hours of its arrival at the creamery. All cream of the same butter-fat content and of the same grade must be paid for at the same rate per lb. of butter-fat, and this rate must be not less than 1*d.* per lb. more for "Third Grade" than for "Below Grade," for "Second Grade" than for "Third Grade," and for "First Grade" than for "Second Grade."

(d) **Butter Blending.**—The blending of butters to secure a homogeneous product of a required standard of quality was developed commercially in Normandy in the 'sixties, that is to say, before centralized manufacture had replaced farm butter-making to any large extent. The blended product when exported to England met with such favour among retailers and consumers owing to its uniformity that the trade rapidly developed. The process was subsequently adopted here, and the demand for the home-blended product was soon so great that it could not be met in the winter months when farm butter production was low. At this time, the importation of butter from the Southern Hemisphere was increasing, and the supplies from these sources synchronized with the season of short supplies of home-produced butter. The blending factories were thus faced with the alternatives either of losing their trade in the winter or of supplementing their winter supplies with imported butter. The latter course was adopted, and the use of imported butter by blending factories has since so far increased that many English-made blends consist solely of imported butter all the year round. The policy of levelling up the winter output by blending imported butter with their own product has also been adopted by some creameries in this country.

From the standpoint of home agriculture, blending is useful as a means of securing uniformity in the supplies of farm-made butter. It has not the effect of raising the general level of quality, however, as has creamery manufacture ; it merely makes the best of what is available. On the other hand, it does not involve any radical change in farm practices. It is suitable for those districts where production is in excess of local needs but where milk production is not sufficiently concentrated for the establishment

of creameries. Just as haulage costs are reduced by cream gathering instead of milk delivery, so they are further lessened if the cream is churned on the farm and only butter is transported.

CHAPTER V.—SYSTEMS OF QUALITY CONTROL.

(i) General.

Butter varies widely in quality, not only as a result of differences in the quality of the milk used and in the conditions and methods of manufacture and subsequent treatment, but also, in some cases, through deliberate adulteration or the addition of substances, such as preservatives, that may be injurious to health.

In this country, the prevention of adulteration and of the use of injurious substances is regarded as the proper function of the State (see Chapter XII). To provide the buyer with a guarantee of the quality, as distinct from the genuineness or sanitary condition, of butter, is, however, a service which the seller should supply as a matter of good business. There have, in consequence, developed, in most of the chief butter-producing countries, systems of marking butter to guarantee that its quality reaches a minimum standard. The guarantee may apply merely to the composition of the butter or it may extend to its general quality. In some cases—in Denmark and the Netherlands, for example—these guarantee marks or brands have been established, in the first instance, by voluntary organizations of butter manufacturers. But in most butter-exporting countries, the use of marks of quality and origin is regarded as so important as a means of safeguarding the reputation of produce in export markets that national guarantee marks have been established by the State and their use has been made compulsory for all butter exported. Unofficial marking systems have, in many cases, been preserved as the basis of the compulsory systems.

The value of these marks to the buyer rests upon the efficiency of the quality-control, of which two methods are found in practice. The first is that of control by sample, by which permission is granted to approved butter manufacturers to apply the mark to their output, the quality of butter sold under the mark being checked by frequent inspection. Surprise samples of butter from creameries using the marks are taken periodically; in the event of any particular sample failing to reach the required standard, a closer watch is kept on the output of the creamery concerned, and if it is found that a permanent falling-off in the general standard of quality has taken place, the creamery is debarred from using the mark again until further samples show that the required standard has again been reached.

The second method is that of official grading, by which the mark is actually applied by the controlling body, generally the State ; under this system, every package of butter is graded to defined standards of quality by competent judges before the mark is applied. Butter that does not reach the standard is not marked. There may be several grades and a different grade-mark may be used for each grade.

The first system is the easier to operate but pre-supposes a fairly high degree of uniformity in the quality of the output of the individual manufacturers. Where conditions are variable, as in farm butter-making, this method would do no more than provide a guarantee of composition, purity and origin. Even where creamery manufacture prevails, it is less suitable than a grading system as a means of guaranteeing such quality features as flavour. There is always the risk of the standard of quality maintained by any producer deteriorating in the interval between the examination of samples, so that there may be times when butter below the required standard is being sold under the mark. Moreover, where a sample is found to be inferior, the only redress is the temporary withdrawal of the right to apply the mark, and where only marked produce may be exported, this is a serious matter for the creamery concerned though admittedly a powerful incentive to quality production.

The grading of butter by official graders before the grade-mark is applied makes possible a more complete control over the quality of butter bearing the mark, but it pre-supposes a greater concentration of supplies in the course of production or marketing. It is well adapted for countries whose produce is mainly exported by sea and must, therefore, in any case, pass through a limited number of ports. The establishment of grading stations at the ports enables the grading to be carried out without interfering with the natural movement of supplies. Although the system of control by sample does not equally necessitate concentration of supplies, it is, nevertheless, also more simple to operate under export conditions.

Of the two systems, that of control by sample is used in most European exporting countries, and official grading in the principal Empire butter-producing countries. In Finland, however, a combination of the two is used. The principle of control by sample is found in the only attempt at organized grading that has been made in this country—that of the Devon Butter Producers' Association (see p. 61).

Besides the official quality mark, which acts also as an indication of the country of origin, all packages of butter exported are required in some countries to bear a description of the kind of butter contained. The name or registered number of the producing creamery or of the exporter, the churning number, the grade of cream from which the butter was made, the date of production, the date of

grading or inspection and the net weight may also be indicated. In fact, so many kinds of markings are used in the various exporting countries that there seems to be a need for some standardization of the marking methods themselves. It is at least desirable that all exporting countries should mark their packages of butter with the name of the country of origin and the net weight of the contents. The question of securing international uniformity of practice in marking exported butter was discussed at the International Dairy Congress at Copenhagen in 1931,* and a resolution was passed recommending that both the International Dairy Federation and the International Institute of Agriculture should inquire into the question.

(ii) Grading Abroad.

(a) **New Zealand.**—The necessity for grading all dairy produce before export as a means of safeguarding the reputation of the national product in overseas markets was realized in New Zealand towards the end of last century. The Dairy Industry Act, passed in 1892 and amended in 1894, made provision for the compulsory grading of butter and cheese before export. This and subsequent legislation were consolidated in the Dairy Industry Act, 1908, which, with a few later amending Acts, is still the principal enactment controlling the grading of dairy produce in the Dominion. By regulations under this Act, butter must be graded by an official grader before export is allowed. .For the purpose of grading and freezing, butter intended for export to Australia and the South Sea Islands must be forwarded to one of 17 appointed stores at least 24 hours before shipment ; for export to other countries, it must be forwarded at least 4 clear days before shipment. At the same time, the owner must inform the grader at the port of shipment of the number of packages, the brands, contents, weights and other particulars of the butter forwarded to store. Within a reasonable time of its receipt into store, the temperature of the butter must be reduced to not more than 15°F. The forwarding of butter to a grading store does not relieve the owner of his responsibility for the butter ; he must still make his own storage, shipment and insurance arrangements.

All butter exported must be declared as of one of the 4 following types—viz. creamery butter, whey butter, dairy butter or milled (i.e. blended) butter. The grader examines at least one box from each churning. The method of grading for creamery butter and

* See a Paper, entitled "The Systems of Marking Butter Intended for Export," read by M. de Wachenfelt, Agricultural Counsellor to the Swedish Legation in London and The Hague.

whey butter is the scoring method, the maximum number of points allotted to the various quality factors being as follows :—

Flavour and smell	50
Body	25
Colour and salting	20
Finish	5
Total	100

Dairy butter and milled butter are not graded to a definite scale of points but according to general quality and condition.

There are 4 grades for creamery butter and 3 for other kinds. The grades for creamery and whey butter and the minimum qualifying points for each grade are as follows :—

Grade.	*Creamery Butter.*	*Whey Butter.*
Finest	93 and over	——
First Grade	90 and under 93 ...	88 and over.
Second Grade	80 and under 90 ...	80 and under 88.
Third Grade	Under 80	Under 80.

All butter, of whatever grade, must contain not more than 16 per cent., by weight, of water and not less than 80 per cent., by weight, of butter-fat.

As soon as possible after grading, each package is stamped with its appropriate grade mark (Fig. 9) and the grader then forwards to the owner of the butter a Certificate of Grading. No butter may be exported without its appropriate grade-mark and all butter bearing a grade-mark must be exported. To creamery butter of either of the first two grades, the official New Zealand export mark—the Fern Leaf (see Figs. 35 and 37)—is applied.

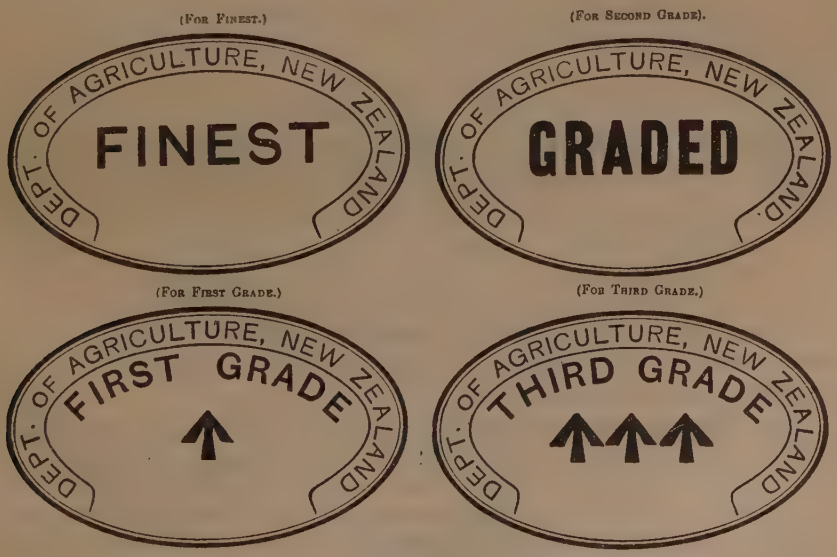

Fig. 9.

The grader's decision is final but, in certain circumstances, he may re-grade butter and the original grading may be amended. For the grading service, a fee is charged by the Dominion Government of 1·24*d.* per standard box of butter.

(b) **Australia.**—In Australia, by the Commerce (Export Dairy Produce) Regulations of 1930 and other Proclamations under the Customs Act, 1901–30, and the Commerce (Trade Descriptions) Act, 1905–30, no butter may be exported unless it has first been graded by an officer of the Customs. All butter exported must contain at least 82 per cent. of butter-fat,* and may not contain more than 16 per cent. of water, 2 per cent. of casein or 2·5 per cent. of salt. It may contain colouring matter of a harmless nature but no other foreign ingredient.

The exporter must give written notice, in a prescribed form, of his intention to export butter, and all butter intended for export must be sent to an appointed place for examination at least 3 clear working days before shipment, except in the case of milled butter, which must be delivered at least 7 clear days before shipment.

Butter must not be graded until it is at least 4 days old, and no butter which, in the opinion of the grader, is unfit for export is graded. The temperature of the butter during grading must be between 40° and 70° F.

The scoring method of grading is used, the scale of maximum points being as follows :—

Flavour and aroma	50
Texture (including body, grain and moisture)...	30
Condition (including colour, salting, packing and covering)	20
Total	100

There are 4 grades for Australian butter ; their names and the total number of points required to be scored for each are as follows :

Choicest	92–100
First Grade	89–91
Second Grade	86–88
Pastry	80–85

No butter may be included in " Choicest " grade unless it has been manufactured from pasteurized cream. Butter scoring less than 80 points may not be exported.

After grading, the official grade-marks are applied by rubber stamp to the packages. In the case of butter of " Choicest "

* The butter-fat content may, however, be as low as 80 per cent. for butter exported for consumption in a country where the minimum butter-fat standard for butter is below 80 per cent.

grade, the grade-mark applied is the national quality mark—i.e. the so-called Commonwealth Standardization Trade Mark, more commonly known as the Kangaroo Mark (Fig. 10). With the exception of tinned butter, the butter must then be placed in an appointed cool-store and kept at a temperature not exceeding 20° F.

Fig. 10.

A fee of ½*d.* per box of butter is charged to cover the cost of the examination and grading services. On payment of this fee, exporters are supplied with export certificates for presentation to the Customs authorities when the butter is shipped. Any butter which, after grading and marking, is removed from store for consumption within the Commonwealth has the grade-marks cancelled before removal.

(c) **Irish Free State.**—Butter grading in Ireland is no new thing; it was initiated on a voluntary basis as far back as the middle of the 18th century through the medium of the Cork Butter Exchange, established in 1769. In 1903, a system of surprise inspections organized by the State was instituted, which continues in an improved form as part of the system of quality control instituted under the Dairy Produce Act, 1924. The object of this Act is to improve the general standard of butter and other dairy produce by regulating manufacture, marketing and export.

The Act governs *inter alia* the kind of premises and equipment used in the production of butter for export as well as the conditions of manufacture and the qualifications of the technical staff employed. The provisions of the Act in this respect are enforced by registration and inspection of all premises from which butter is exported. The kinds of packages, the methods of packing and the marking of packages and wrappers are also prescribed. Provision is made for the examination of creamery and factory butter before export. Only butter that reaches a minimum standard of quality is allowed to be exported. The Act also provides for the establish-

ment of a National Mark for Irish Free State dairy produce, but this part of the Act has not yet been put into force.

The methods of examination before export are the same for creamery and factory butter, but the standards for the latter are slightly lower. The examination is carried out at the port of export by Inspectors of the Department of Agriculture. One package from each churning of creamery butter and 10 per cent. of all packages in each consignment of factory butter are selected for inspection. After opening and emptying the sample package, the Inspector examines both package and contents for cleanliness and freedom from moulds, and then, by means of a butter-iron, samples and tests the butter for flavour and texture. The weight and temperature of the butter are also checked.

The flavour and texture are judged by the scoring system, according to the following scale of maximum points :—

Flavour	60
Texture	30
Total	90

The minimum scores required for each type of butter before export is allowed are as follows :—

	Creamery Butter.	*Factory Butter.*
Flavour	54 ...	50
Texture	24 ...	20

In the case of creamery butter, if the package selected does not comply with requirements, that part of the consignment which bears the same churning number as the package examined is rejected as unfit for export. In the case of factory butter, the whole consignment is rejected if 5 per cent. or more of the packages do not comply with requirements. In addition, out of every consignment rejected, one box of butter is forfeited to the State. Each package examined, after re-closing, is stamped in red ink as follows :—

OPENED FOR EXAMINATION
BY INSPECTOR UNDER
DAIRY PRODUCE ACT, 1924.

In addition to the regular examination of butter at the ports, there is, under the Dairy Produce Act, a compulsory system of surprise inspections of all creamery butter. Inspectors visit each creamery at irregular intervals, approximately fortnightly,

during the manufacturing season, and select and seal at random a package from the butter in stock. The sealed sample from each creamery is sent, within 2 days from the date of sealing, to the Butter Testing Station at Dublin, where, before being judged, it is retained under ordinary commercial conditions for a period of from 11 to 15 days so that the quality may be estimated at a stage corresponding to that at which, in the ordinary course of trade, the product would appear on the consumer's table. Each sample is then examined by 3 judges independently and marks are awarded on the following scale of maximum points :—

Flavour	60
Texture	30
Colour	5
Packing and Finish	5
Total	100

Each sample is also weighed and tested for water-content, salt, yeasts and moulds ; bacterial analyses and other tests, such as for metals and preservatives, may also occasionally be made.

When samples from each creamery have been judged, a schedule of the results is issued to the creameries concerned, the first 24 creameries on the list being distinguished by name, the remainder by number only. The samples are returned to the creameries so that each manager can examine his butter in relation to the marks awarded and in the condition in which, in the ordinary way, it would reach the consumer. Particulars are also given of any special defects, together with an indication as to the improvement that is necessary. If desirable, an Inspector may be directed to visit the creamery to assist the manager in improving his technique.

(d) **Northern Ireland.**—The output of creamery butter in Northern Ireland is about the same as in Great Britain. Strenuous efforts have been made by the Ministry of Agriculture to improve the quality of production. All creameries must be registered and periodical visits of inspection are paid to creameries by the Ministry's inspectors, who advise the managers both on the technique of manufacture and on marketing matters.

A system of marking butter of approved quality with a Government stamp is also operated. Surprise inspections of butter at creameries and in the course of distribution, both in Ireland and Great Britain, are made by the Ministry. Samples must be supplied when called for, and are graded by judges, selected from prominent butter merchants, into 3 grades—viz. :—" Premium," " Standard " and " Below Standard." Creameries whose output is graded " Premium " or " Standard " at 6 successive inspections are entitled to use a Government mark, which is withdrawn from any creamery whose butter at a subsequent inspection is graded " Below Standard."

Besides the official control system, arrangements are made for the grading of butter coming into Belfast, by a joint committee of butter merchants and creamery managers which was set up in 1930 as the result of a conference called by the Ulster Agricultural Organisation Society. Creameries have agreed to ship their butter on two days of each week and to mark all boxes from each churning with a code mark. Butter is graded on arrival at the Central Railway Station, Belfast ; grading is done on request of the consignee by two butter merchants and the secretary of the Committee, one box being examined from each churning. Butter graded " Premium " is conspicuously marked as such and is stencilled with a special trade-mark, registered in the name of the U.A.O.S., which has been given publicity by press advertisements.

(e) **Other Empire Countries.**—In Canada and South Africa, there are official grading systems similar to those in New Zealand and Australia. The scoring system is used and minimum scores are prescribed for 4 grades in each case. In Canada, a minimum score for flavour is also prescribed for each grade, and distinction is made between butter from pasteurized and unpasteurized milk or cream respectively.

(f) **Denmark.**—The dairy industry in Denmark has developed mainly on co-operative lines. Not only are practically all the creameries now co-operative, but, for the export trade, they have themselves united to form co-operative butter export associations (see Chapter IX). It was early felt that some brand was needed to identify Danish butter and act as a guarantee of quality to the buyer. In 1900, therefore, the creameries in Denmark formed a society for the establishment and control of a brand—the " Lur " brand (Fig. 12)—which was quickly taken up by the creameries voluntarily. In 1906, legislation was passed under which only butter bearing the " Lur " brand could be exported ; conditions were imposed in respect of the use of the brand, which have since become increasingly strict. At present, butter may not be packed under the " Lur " brand unless (*i*) it has been made from pasteurized cream, (*ii*) it contains not more than 16 per cent. of water and not less than 80 per cent. of butter-fat, (*iii*) it contains no preservative, other than common salt, and no aniline dye, and (*iv*) it is of a satisfactory standard of quality.

The method of quality control for butter packed under the " Lur " brand is that of control by sample. Authority to apply the brand is granted to the creameries themselves, a system of examination, at irregular intervals, of samples bearing the brand being carried out by the State.

The method of marking butter with the " Lur " brand is as follows. The Ministry of Agriculture issues to each creamery, on payment, a number of cask-staves which bear the " Lur " brand and an identification number allotted to the creamery for

the current year. Two of these staves are incorporated by the creamery in each of its butter casks. Paper labels, bearing the "Lur" brand and the creamery's identification number, are also issued to the creameries to be placed on the top of the butter in each cask. The creamery is required to stamp the date of manufacture of each cask of butter on both the label and the "Lur" brand staves at the time of packing.

Creamery managers are required, on demand, to send one sample cask from the butter in stock to the Government laboratory in Copenhagen. Normally, each creamery is called upon for a sample about 3 times a year, though, if any sample is found to be inferior, more frequent calls may be made. Approximately 120 sample casks are assembled at the Government laboratory each week, and are there judged by an official panel of 9 persons, consisting of butter merchants, creamery managers and dairy experts. The personnel of the judging panel is changed each week. Until judged, the samples are kept in cold-store at a temperature of about 50° F.

During judging, the identity of the creamery from which each sample has been drawn is concealed, the samples being known merely by numbers. Each judge independently examines each sample, and, basing his assessment on the flavour, aroma, texture and colour of the butter, allots points out of a possible total of 15. The average score obtained by each sample is then calculated and also the average of all the samples taken together. Each creamery is then informed of the difference in points (plus or minus) between the average score obtained by its sample and the average of all the samples judged that week. The points actually awarded and the average number of points allotted to all samples are not disclosed. In addition to this assessment of quality, the net weight is also checked and a sample is taken from each cask and retained for 14 days to enable the keeping quality to be judged.

There is no verbally defined standard for "Lur" brand butter; but where the quality of any sample falls below the standard which, in the opinion of the judges, "Lur" brand butter should attain, the creamery manager is called upon to submit another sample at once. If this is also below standard, the manager is instructed to call in one of the Dairy Advisers, of whom there are 5 in Denmark, each in charge of a separate "dairy circle." The Dairy Adviser, as a result of his visit to the creamery, decides whether it shall be permitted to continue to use the brand. He may, if he thinks fit, order all staves and labels bearing the brand to be withdrawn from the creamery, and in that case it is not until he and the butter judges in Copenhagen are satisfied that the quality of the creamery's output is again satisfactory that the right to apply the brand, and therefore to export butter, is restored.

The cost of the control system is borne by the industry; formerly it was a State charge. A charge is made of about 15 Kroner for each sample cask examined, and as 3 samples are

normally taken from each creamery every year the total cost to each creamery amounts to about 45 Kroner (i.e., about £2 10*s.*) per annum. If a sample below standard is submitted and additional samples in consequence have to be called for, the expense of the inspection service to the creamery is correspondingly increased.

In addition to the State control of quality, the co-operative butter export associations (see Chapter IX) exercise a supplementary control of the quality of the butter sent in to them weekly from their associated creameries. One cask from each creamery's weekly consignment is put aside for judging by a Committee, which includes a number of creamery managers. As in the State-control system, the butter is awarded points out of a maximum of 15, and the final score of each sample is the average of the points awarded by all the judges. A sample from each cask is retained for 14 days and rejudged in order to check the keeping quality; the sample may be referred to in the event of any complaint being made by a purchaser within the 14 days. These quality tests form the basis of bonus payments to the creameries by the export associations (see Chapter IX).

The judging of the weekly output of each creamery by the export associations, together with the surprise examinations carried out by the State and the policy that is adopted in Denmark of clearing stocks weekly, has the effect of maintaining a very high standard of quality in "Lur" brand butter. But strict as is the control of quality, there remains a certain individuality in the quality and character of the output of the various creameries, and buyers, purchasing through the export associations, often specify from which creamery they wish their orders to be met.

(g) **The Netherlands.**—There is no system of grading butter, in the full sense of the term, in the Netherlands. There is, however, a very strict system of control of the butter-fat content of all butter exported. This is based on the examination of samples and is operated by the industry itself under State supervision. The system resembles that in use for cheese.* It has gradually evolved from the measures adopted towards the end of last century to deal with the adulteration of butter with margarine; its object is to safeguard the consumer and the *bona-fide* producer and, at the same time, establish a reputation for Dutch butter both at home and abroad.

In 1885, the Society for the Prevention of Fraud in the Butter Trade was founded; this body secured the passing of the first Butter Law, which, however, only penalized the sale of adulterated butter and had little effect on the export trade. From 1895 onwards, a number of local associations of co-operative creameries adopted marks guaranteeing the quality of their members' produce.

* *See* Economic Series No. 22, pp. 64–7.

It soon became apparent, however, that an impartially guaranteed mark was desirable, and, in 1903, the first butter-control station was established in Friesland by the Agricultural Society for that province. This Station carried out a much more rigorous contro of the quality of its members' output than had previously been exercised. It was followed by a similar move in other provinces ; in the earlier years, however, the various stations were free from State control or supervision.

While the results of these local efforts were considerable, it became apparent that co-ordination, under State supervision, was required. In 1905, therefore, an Act was passed which, while retaining the system of control by the industry itself, made it compulsory for all butter exported from the Netherlands to bear the control mark and placed the Control stations under State supervision.

There are, altogether, 9 Butter Control stations, one in each of the principal butter-making districts. Membership, which is made up almost entirely of creameries, is in all cases voluntary. Each station is a self-supporting unit, operating on co-operative lines and maintained by annual subscriptions from members and by the revenue obtained from the sale of marks ; any surplus funds, after providing for the maintenance of a reserve, are returned to the members each year. The station management is in the hands of a board appointed by the founders or promoters and by the members. Uniformity in the operation of the stations is secured by a board known as the Central Board of the Butter Control stations, established in 1912, which represents the stations as well as the State, and acts in an advisory capacity to the Minister of Agriculture in all matters relating to the control system.

The conditions of station membership are highly important. They include the following :—

> The member's output must consist only of butter as defined by statute—that is, butter containing no other fat constituents than those derived from milk.
>
> No butter sold by the member must contain more than 15½ per cent. of water.
>
> Members may not be connected with the trade in margarine or other fats or oils capable of being used for the adulteration of butter.
>
> Members' butter must all be marked with control marks in the manner laid down.
>
> Daily records must be kept showing the serial numbers of the marks used, the quantities of milk and cream received, the quantity of butter made, and, for each consignment of butter sold, the names and addresses of the consignees.

The control system consists of the issue of Government marks by the control stations to their members. These marks take the form of thin tissue-paper labels, in 5 sizes, for use on different units of butter ; they bear the prescribed design and a serial number (Fig 11). The labels are applied by impressing them on the surface

of the butter in the cask with the aid of a notched wooden die. This die perforates the labels in such a way that they cannot be removed without tearing, and are, therefore, rendered unfit for use a second time.

Fig. 11.

The marks not only serve as a guarantee of the composition of the butter but, in conjunction with the records that are kept by the stations of the serial numbers of the marks issued to each member and those kept by members of the numbers of marks used daily, they enable the date of manufacture and the identity of the maker to be established.

The outdoor staff of the control stations periodically visit members' premises to check records and take samples of butter for analysis in the station laboratory. Each member is visited at irregular intervals, but, on an average, at least twice a month.

The part played by the State in the control system, besides that of protecting the marks, is twofold. In the first place, it distributes the marks at cost price to the boards of the control stations; secondly, independently of the work of the stations, it supervises the use of the marks and inspects and supervises generally the work of the stations themselves.

Members who contravene the conditions are liable to fines, suspension and, eventually, cancellation of membership, which has the effect of exclusion from the export trade.

(h) **Finland.**—The examination of butter for export has been practised in Finland since 1903. Up to 1928, it was voluntary, but since that year it has been compulsory. The system in use is a combination of grading proper and control by sample. The method of control by sample is in respect of the composition of the butter. As in the Netherlands, a control Mark (Fig. 15) is applied by the producer under State supervision; this guarantees the composition, purity and weight of the butter. No butter may be exported from Finland unless it bears this control mark. The

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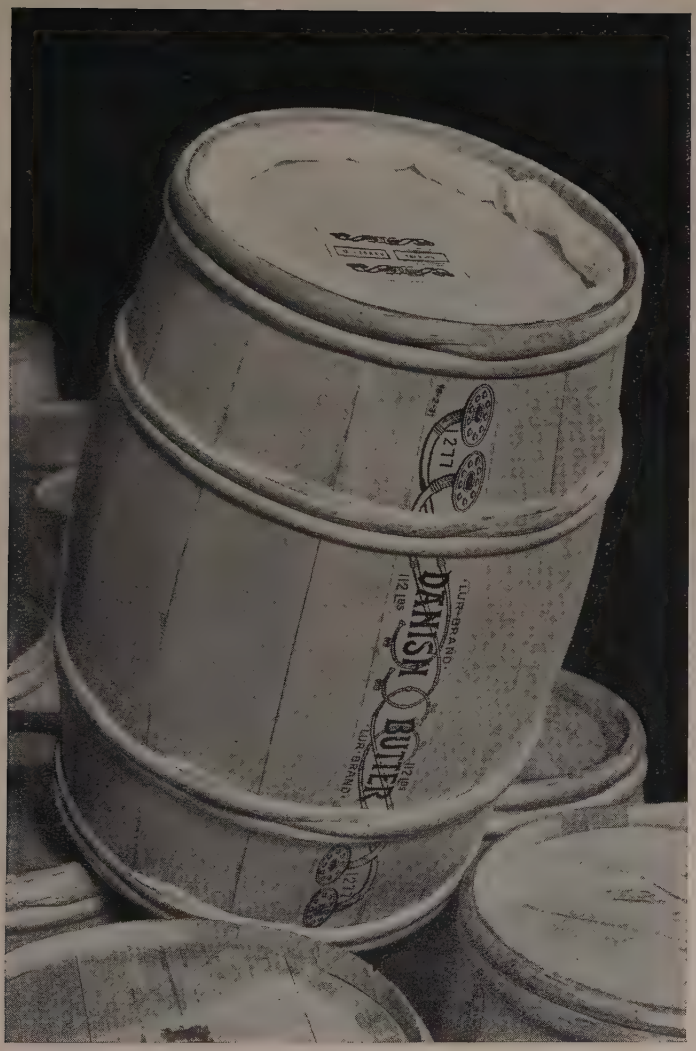

FIG. 12.—Danish butter cask showing stave stamped with the official "Lur" brand.

FIG. 13.—Butter scoring at the Finnish Government's Butter Warehouse.

FIG. 14.—Finnish butter cask.

marks, consisting of thin paper labels bearing the creamery's registered number, are issued to approved creameries by the State

Fig. 15.

Butter Control Station and are applied directly to the top surface of the butter in the cask. The principal conditions attaching to the use of the control marks are that the butter to which they are applied must be unadulterated Finnish butter, must have been made from cream pasteurized at a temperature of not less than 176°F, may not contain over 16 per cent. of water or less than 80 per cent. of fat, may contain no preservatives or aniline dyes, and must be carefully packed in clean standard casks ; the butter and the packing material must be free from mould ; each cask must contain 50·8 kilos of butter together with an allowance for overweight of at least 0·3 kilos.

Butter bearing the control mark is graded before export with respect to its general quality. The examination is carried out each week by panels of 3 judges, consisting of two officials of the Control Station and one representative of the export firm whose

Fig. 16.

butter is concerned (Fig. 13). In judging, account is taken of flavour, odour, consistency, appearance and packing. A score is

allotted to each sample on the basis of a 15-point maximum. No butter scoring less than 9 points is allowed to be exported. Butter scoring not less than 10·7 points is marked with a national mark of quality and origin—the "Suomi" brand (Fig. 16). The mark is stamped on the cask between the two topmost pairs of hoops (Fig. 14). Butter scoring between 9 and 10·7 points is not marked with the "Suomi" brand but the lid of the cask is stamped with a special loading mark which entitles it to be exported.

Samples of butter from each creamery are also taken, from 3 to 5 times a year, or more often, if necessary, to enable keeping-quality to be tested. These samples are stored for 14 days at a temperature of from 43° to 50° F., after which they are judged by a committee of 6 persons. The butter is then about 3 weeks old, and if it scores less than 9·7 points, the creamery concerned loses the right to have its output stamped with the quality mark until further tests show sufficient improvement.

Before any butter bearing an official export mark can be sold on the home market, the mark must be removed by the exporter and the control station notified.

(i) **Sweden.**—The Swedish system of quality control closely resembles the Danish. No butter may be exported that does not bear the national trade-mark—the "Rune" brand (Fig. 17)—which is registered in the name of the Swedish Ministry of Agriculture.

A condition of use of the "Rune" brand is that the creamery's butter must be submitted to periodical tests for quality and composition at the ports of Malmö and Gothenburg. Besides reaching the required standard of commercial quality, "Rune" brand butter must contain not more than 16 per cent. of water, no preservatives other than salt, and must have been made from

Fig. 17.

cream separated from whole milk and pasteurized at a temperature of not less than 176° F. Creameries using the "Rune" brand

must submit their premises and equipment and their transport arrangements to inspection by the Butter Testing Department of the Ministry of Agriculture, which controls the use of the brand.

The "Rune" brand is applied, together with the number of the creamery concerned, to the butter casks and to the parchment paper with which the casks are lined. Cask-staves and paper bearing the brand are supplied, on payment, by the Butter Testing Department, and all creameries are required to keep a register of quantities used, which must be open for inspection and from which monthly extracts must be sent to the Department. No marks other than the "Rune" brand and necessary transport and shipping marks may be applied to packages of butter exported except with the consent of the Butter Testing Department.

(j) **Germany.**—The countries whose grading methods have so far been described are exporting countries. Germany, however, is an example of an importing country where measures have been adopted to control the quality of the home product on the domestic market. Next to Great Britain, Germany is the largest butter importing country, and of late years the competition of imported butter of superior and uniform quality, mainly from Denmark and the Netherlands, has been acutely felt by the German butter industry. In the chief butter-making districts of Germany, the industry is already largely in the hands of creameries, so that standardization should not be a difficult matter.

It was natural that the movement towards quality control should have originated in the principal butter-making area, namely, the Province of Schleswig-Holstein, which, long before the War, enjoyed a high reputation for its product. A Butter Control Station was set up at Kiel in 1925 by the Landwirtschaftskammer (Chamber of Agriculture) to guarantee, by means of control marks and the inspection of samples, the quality of the butter produced by its affiliated creameries.

Schleswig-Holstein adjoins Denmark and, as might be expected the scheme showed signs of Danish influence. The scheme is, in fact, very similar to that by which the reputation of the "Lur" brand is protected.

Authorization to use the control mark is given to creameries after they have been approved by inspection and provided that 3 consecutive sample casks of their butter are passed by the Control Station. Authorization holds good so long as the creamery conforms to the regulations and so long as its butter reaches the standard required. The quality of each creamery's output is tested from time to time by the examination of samples, each creamery on demand being required to dispatch a sample cask to the Control Station within 24 hours. Surprise samples are called for at intervals of about one month. Samples are kept for 10 days at a temperature of from 50° to 54° F. and their quality is then

assessed by the scoring method on the following scale of maximum points :—

Flavour	10
Composition	3
Odour	3
Appearance	2
Texture and body	2
Total	20

Samples must score 17 points out of 20, of which 9 must be for flavour. The butter must also comply with legal requirements as regards moisture-content—viz., a maximum of 16 per cent. for salt butter and 18 per cent. for unsalted butter. If a sample taken from any creamery fails to reach the required standard of quality and composition, the creamery loses the right to apply the mark until a subsequent sample proves satisfactory.

The example of Schleswig-Holstein has been followed by the Chambers of Agriculture in other provinces. In the Rhineland Province, for example, a Control Station has been set up at Bonn. In this instance, a condition attaching to the use of the control

Fig. 18.

Fig. 19.

mark is that cream for butter-making must be flash-pasteurized at 185° F., or pasteurized for half-an-hour at 145° F., and then

cooled to 50° F., and must be properly ripened, before churning by the use of a pure lactic-acid starter.

In Pomerania and East Prussia, which are the two provinces nearest to Finland, the method of control adopted more nearly resembles the Finnish system and all the butter is actually examined before the mark of quality is applied. This, however, has necessitated the establishment of a central butter-selling organization through which all the produce can pass. The adoption of grading proper in the internal trade of an importing country is hindered by the change that it calls for in the distributive system. In Schleswig-Holstein, the possibility of a compromise between the two methods is being examined.

Figure 22 illustrates the labels issued by a number of the butter-control associations.

(k) **Other Foreign Countries.**—In Estonia, Latvia and Lithuania there are compulsory control systems on similar lines to the Finnish system. The control marks used in the two first-named are shown in Figures 18 and 19.

In Norway, a voluntary system of quality control is carried out for butter by the Federation of Norwegian Dairymen. This organization has its own registered mark (the Four-leaved Clover) (Fig. 20) which may be used by its members subject to the control of the Federation.

FIG. 20.

In the United States, butter grading is voluntary. There are 13 Federal grades for dairy, creamery and blended butter, based on a scoring system. Grading is carried out, on request, by graders of the United States Department of Agriculture.

(iii) Experience of Grading in England and Wales.

The only attempt at organized grading of butter that has been made in this country is that of the Devon Butter Producers' Association—a small association of farm butter-makers. This Association, established for the purpose of guaranteeing the quality of its members' produce, operates a system of quality control based on the inspection of samples bearing the Association's brand (Fig 21). Members who wish to use the Association's design have first to submit their premises and equipment and samples of their butter to inspection by the Association. If approved, the applicants are registered and allotted a number, and wrapping-papers bearing the Association's registered design and the members' numbers are issued to them. Each member is called upon periodically to submit samples for examination. In the event of

these samples being below standard, as judged by the Association, the right to use the Association's mark is withdrawn. To some

FIG. 21.

extent, the Association assists its members to market their produce, enquiries from new customers being received and arrangements made for individual members to take up the supply.

CHAPTER VI.—STANDARDIZATION OF HOME-PRODUCED BUTTER.

(i) Possibilities of Standardization.

(a) **Farm Butter.**—Reference has already been made to the extreme variations in quality and character that are found in farm-made butter. This would, at first sight, suggest the need for a system of grading farm butter to standard grades. The legislative basis for the establishment of standard grades and grade-marks and an organized system of quality control is afforded by the Agricultural Produce (Grading and Marking) Acts, 1928 and 1931, which empower the Minister of Agriculture and Fisheries to establish and define statutory grades for agricultural produce and to prescribe marks to represent grade designations. Under these Acts, grades and grade designation marks, incorporating a design known as the National Mark, have been established for a number of agricultural products.

By granting to approved farm butter-makers the right to apply the Mark to butter of a minimum quality standard subject to supervision—the principle underlying the Devon Butter Producers' scheme*—it might be possible to ensure that good butter was distinguished from that of inferior quality; though, as it would only be practicable to take samples of each maker's product at infrequent intervals, there would be a big loophole for the sale

* See above.

of butter of poor quality under the Mark. The greatest difficulty, however, is that of the wide variations in type, as distinct from gradations of quality, between the output of different farms. The conditions of production of both milk and butter differ so widely from farm to farm that, although the butter produced on one farm may be no better and no worse in respect of flavour, for example, than that produced on another, there may at the same time be a decided difference between the two articles. To the consumer, these differences are of great importance. The difficulty is accentuated by the fact that, as the total output of each farm is small, any consignment of considerable size must often comprise supplies from more than one farm. Nor, without blending, could the difficulty be overcome by the assembly of farm butter at central points for sorting into grades and types, for the parcels would be so small and show so wide a range of differences as to make the matching of lots difficult, if not impossible.

In these circumstances, a National Mark scheme for farm butter would be of doubtful commercial value and might even react unfavourably on the reputation of the Mark itself.

(b) **Creamery Butter.**—Creamery butter, owing to the greater control over the conditions of manufacture, is far more uniform in character than the farm-made product, and centralization of butter manufacture, apart from its effect on the economy of production, appears to be a step which must precede any widespread attempt at standardization.

The possibility of developing the creamery butter industry in this country on a considerable scale is part of the wider problem of organizing milk marketing. Under existing conditions, there would be certain difficulties. The areas in which milk is available in quantity for manufacturing purposes may be divided into those where farm butter-making now largely prevails and those where other milk products are manufactured. In farm butter-making districts, there is a strong local preference for the farm-made product, which therefore, in spite of its diversity, commands a higher price than creamery butter, either home-produced or imported. Centralization of manufacture in those districts would mean, therefore, that the creamery product would be at a disadvantage in its local market so long as farm butter-making continued. In farm butter-making districts where prices are seasonally depressed by the pressure of heavy supplies which are unsuitable for dispatch to distant markets, because of their diverse character and the small consignments in which they are available, the value of centralized manufacture is gaining recognition. The effect of the establishment of creameries in these areas, however, would be to transfer to the centralized industry the burden of relieving the local market of surplus while leaving the remaining farm butter-makers free to reap the advantage of higher local prices. The development of a creamery industry

in these areas thus appears to depend on some comprehensive milk marketing scheme controlling the whole output of those areas.

In districts where other dairy products are now made, the determining factor is the relative remunerativeness and convenience of cheese-making and milk-condensing as compared with butter-making. This largely depends on the possibility of disposing of the by-products, which, in the case of butter, contain a high proportion of the constituents of the raw material. In these districts, also, organization is needed as a means of spreading the burden of manufacture equitably over all producers.

The Agricultural Marketing Act, 1931, provides the legislative basis on which milk producers, if they so desire, can organize themselves comprehensively for the operation of a marketing scheme with which every producer would be required to fall into line. The Act would enable creamery butter-making facilities to be provided in suitable areas and a system of compensation to be established for producers whose milk was diverted into manufacturing outlets and thus realized a lower price. Under such a scheme, the provision of some system of quality control which aimed at securing uniformity of product would be desirable. A National Mark scheme would provide this control.

But, apart from the possibilities of developing creamery manufacture of butter in this country, the industry is even now by no means insignificant. The application of the National Mark to existing supplies of home-produced creamery butter would seem to be worth while. It would provide the consumer with a guarantee of both origin and quality, stimulate the consumption of home-manufactured supplies and aid the development of large-scale butter production. Up to the present, the demand for home-produced butter, which undoubtedly exists in urban markets, has been met to some extent by blends of home and imported butter which have commonly been bought by the consumer in the belief that they were English. The Butter Marking Order* is intended to prevent any such misunderstanding in future ; but the application of the National Mark to the home product will still be desirable as a means of ensuring that English creamery butter compares favourably in quality and uniformity with the imported article.

The difficulty of applying the National Mark to home-produced factory butter, as distinct from creamery butter, is the purely administrative one of ensuring that no imported butter is used in the blend. With creamery butter, it would be possible to require firms authorized to use the National Mark to have no imported butter on their premises ; but a similar requirement in the case of factory butter would preclude most firms from using the Mark, for practically all blending factories are large producers of blends of home and imported butter and the pure home product in many

* The Merchandise Marks (Imported Goods) No. 1 Order, 1932 (*see* page 89).

cases forms only a small proportion of their output. When experience of the working of the Butter Marking Order has been gained, it may be practicable for the National Mark scheme to be extended to factory butter also.

(ii) Outline of a National Mark Scheme for Creamery Butter.

The characteristics of a National Mark scheme are that grading and marking are voluntary and are generally performed by the industry itself, the State maintaining efficiency by the provision of an inspection service.

(a) **Standards.**—The first step in the preparation of a National Mark scheme for creamery butter would be the prescription of standards. One quality grade only is suggested, which might be designated *Select Creamery*. In order to allow for market preferences, however, it would be necessary to define sub-classes, based on colour and salinity, and to require authorized packers under the National Mark to declare, on the package, the colour and salinity of the butter in terms of these sub-classes. Two sub-classes for colour and three for salinity would meet most requirements. In the case of colour, these might be designated "Pale" and "Deep," the limits of each class being defined by means of a standard colour-chart. For salinity, three classes, designated "Unsalted," "Mildly Salt" and "Salt," respectively, might be established—"Unsalted" containing no salt, "Mildly Salt" up to 1·5 per cent. by weight, and "Salt" more than 1·5 per cent. by weight.

It would be difficult to lay down a satisfactory verbal definition of quality for National Mark creamery butter. It might be required to contain no free butter-milk and a maximum of 16 per cent. of water. So far as flavour, body and texture are concerned, however, standards cannot be defined in words. In grading systems in other countries, the decision whether butter is of the required standard of quality is left to the judgment of impartial experts, either, as in the New Zealand system, official graders, or, as in the Danish system, a panel of judges who periodically examine samples. Under a National Mark scheme, the method of quality-control would be broadly the same as in Denmark.

Authorization to use the National Mark would be granted to approved creameries, which would be required to conform to certain conditions. Approved manufacturers would themselves be responsible for applying the Mark and a constant check would be maintained by a control service upon the quality of the output of each packer by a system of examination of samples by experts.

The discovery of a sample not up to standard would mean that a closer watch would be kept on the offending packer, and, if subsequent samples indicated a persistent deterioration in quality,

authority to apply the Mark would be withdrawn until it was shown that the quality was again satisfactory.

(b) **Marking.**—The scheme would provide for the issue of National Mark labels to authorized packers, on payment, for use on retail and on bulk packages. With bulk butter, the method of marking adopted in the Netherlands could well be followed—viz., that of a thin paper label pressed into the surface of the butter by a defacing stamp which would prevent re-use. A label bearing the National Mark and the registered number of the packer would also be fixed to the outside of the package. This method of marking would not enable the consumer to see the Mark on the butter, because when the butter was unpacked and cut up the Mark would obviously be destroyed. The buyer would have to rely on the retailer to supply National Mark butter on request.

As regards butter pre-packed by the manufacturers for retail sale, small stick-on labels bearing the National Mark would be issued to packers for application to wrappers and cartons; alternatively, the Ministry might license packers, or printers acting on behalf of packers, to incorporate the National Mark in the approved design of private wrappers or containers. The National Mark would thus be taken on the butter right into the consumer's home. Since some retailers, however, prefer to handle butter in plain wrappers, this method of marking would not always be suitable. Another method would therefore be necessary, which might be a modification of that suggested for bulk butter—i.e., the Mark would actually be applied to the butter before wrapping. The label in this case, however, would be smaller and would be made of parchment paper to facilitate removal from the butter by the consumer. Though covered by the wrapper, the label would be visible through the wrapping paper, which is somewhat transparent. As with bulk butter, the packages used for the consignment of pre-packed butter would bear a label with the National Mark and the packer's registered number.

(c) **Conditions of Authorization of Packers.**—The procedure and conditions to be observed by packers authorized to apply the National Mark might include the following :—

1. The premises, plant and equipment of the creamery would be subject to inspection by officers of the Ministry, both before authorization and periodically afterwards, to ensure that they were adequate and suitable for the production of high-quality butter.

2. As the quality of butter depends largely upon the skill of the maker, authorized creameries would be required to employ a butter-maker who held a certificate of proficiency issued by a competent authority.

3. The National Mark would be applicable only to butter made on the premises of the authorized packer, from milk or cream produced in England and Wales, and conforming to the standards of quality prescribed.

FIG. 22.—German labels bearing trade-marks of butter control associations.

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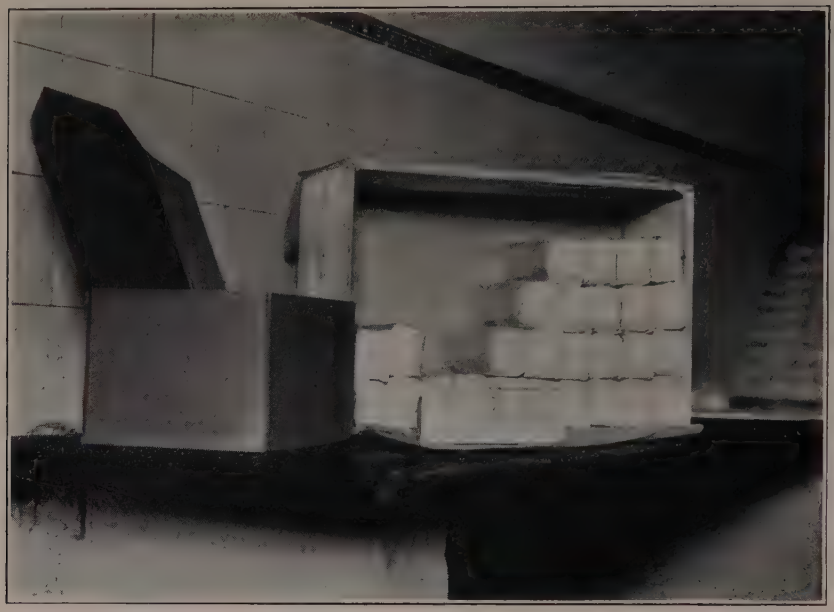

FIG. 23.

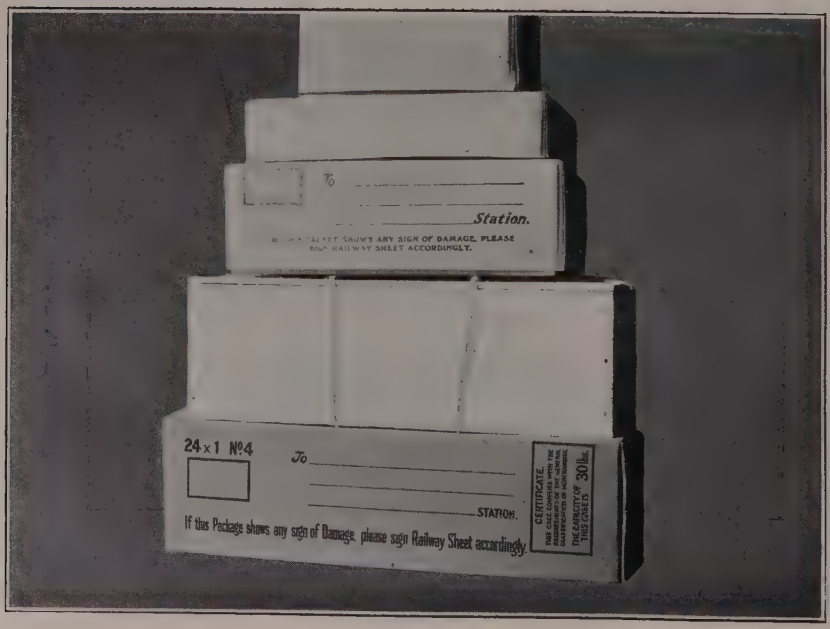

FIG. 24.
Packages for pre-packed butter.

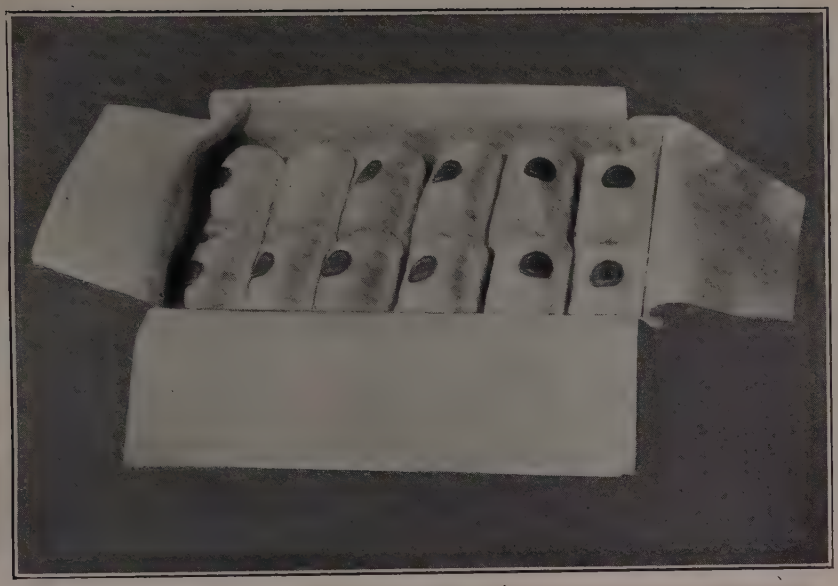

FIG. 25.

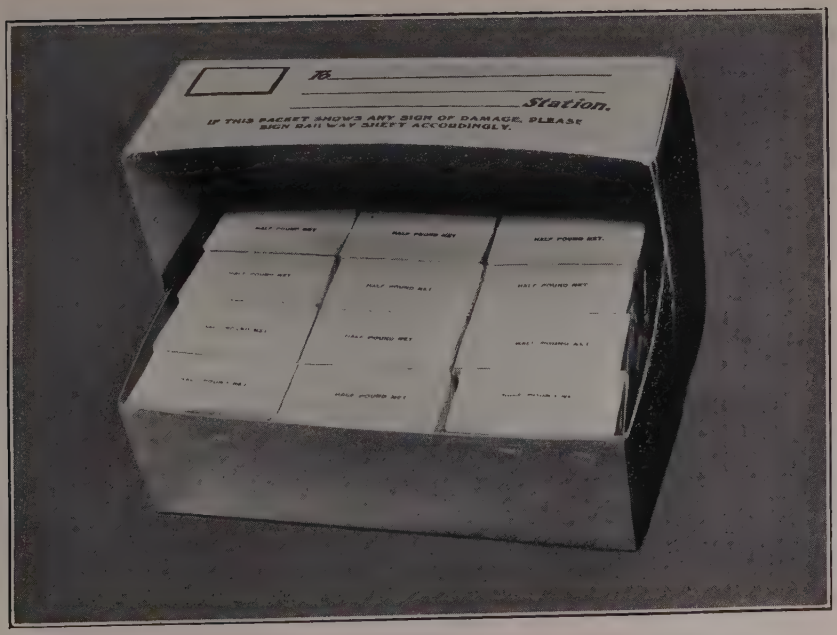

FIG. 26.
Packages containing pre-packed butter.

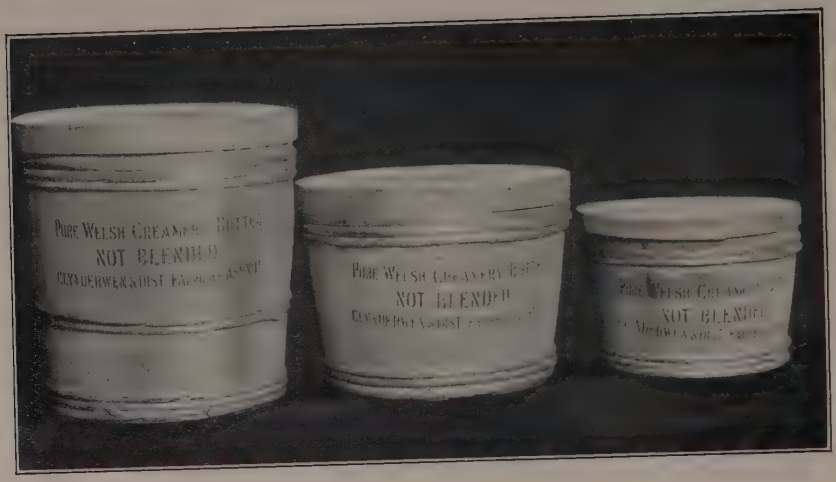

FIG. 27.—Welsh tubs.

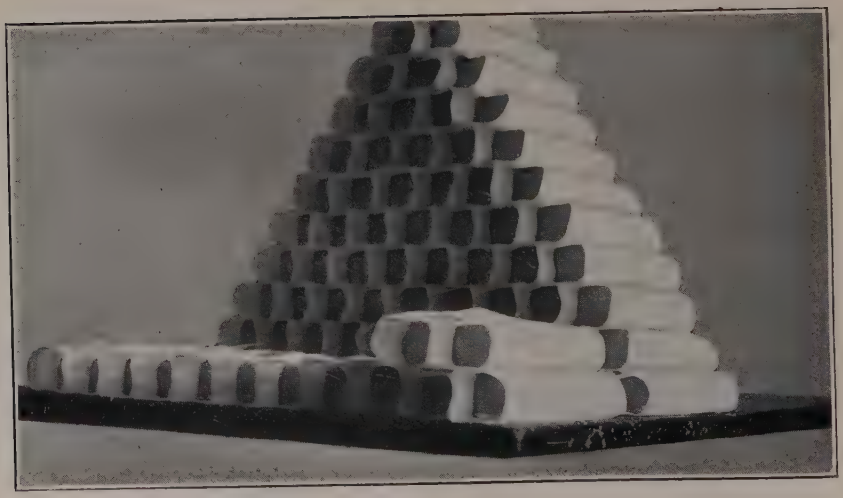

FIG. 28.—Hand moulded and wrapped creamery butter.

4. Authorized packers would not be allowed to have on their premises any margarine or imported butter.

5. All butter bearing the National Mark would be required to be packed in packages of prescribed types and dimensions. The method of lining packages of bulk butter and of making up and wrapping pre-packed butter would also be laid down.

(d) **Control Service.**—At the outset, the use of the National Mark by creameries might be regulated directly by the State; but, in the event of any considerable expansion of the creamery industry, resulting in an increased number of manufacturing units, it is possible that the provision of the necessary control service should, in the main, be assumed by the industry itself.

CHAPTER VII.—PACKING AND WRAPPING.

(i) Home Produce.

(a) **Wholesale Packages.**—For the transport of butter from the farm to the point of assembly—a market or a blender's premises, for example—many different kinds of packages are used. After wrapping in butter muslin, bulk butter may be placed in tubs, boxes, open pails or hampers. As it has to be taken only a short distance and there is no intermediate handling, any package serves the purpose provided it is clean and adequately protects the contents.

Most creamery and factory butter is wholesaled pre-packed in pounds and half-pounds in non-returnable cardboard containers holding 24 lb. (Figs. 23–26). Occasionally, bulk supplies are packed in wooden boxes of 28 or 56-lb. capacity, and in South Wales a shallow oak tub (Fig. 27) with a capacity of 70 lb. is in fairly general use.

Under a National Mark scheme for creamery butter, authorized packers would be required to pack National Mark butter only in new non-returnable wooden or cardboard packages of approved designs.

(b) **Retail Packages.**—Except where the farm producer makes butter for sale in bulk for blending, it is generally made up on the farm into pounds or half-pounds, more commonly the former. Creameries and blending factories also generally pre-pack the greater proportion of their output ready for retail sale (Fig. 28).

The shapes of retail portions vary widely according to local practice (Figs. 29 and 30). For pre-packed creamery and factory butter, which is moulded, weighed and wrapped by automatic machinery (Fig. 31), the brick (Fig. 32) is the commonest shape,

though rolls, which are likewise adapted to mechanical processes, are also made. On farms, where hand-moulding is the rule, there is a great diversity of shapes. There are two methods of moulding —one, that of pressing the butter into moulds, the other, that of beating it into shape with a pair of boxwood "Scotch hands." Patterns are sometimes made on one surface of the moulded portions either by a printing mould or by a "Scotch hand" (Fig. 33). These patterns serve to some extent as makers' trade-marks, enabling the consumer to recognize the product in the shop. Consumers often attach more importance to shape and design than is warranted. Some factories deliberately imitate farmers' methods of making up butter and, where this is done, customers will show a preference for butter with one design as compared with that bearing a different one, even though the butter is the same in both cases.

As regards wrapping, a common method is adopted by creameries and factories which carry out the process by machinery. On farms, the methods of wrapping are even more diverse than the shapes in which the butter is made up. The easiest shape to wrap is the brick, but even for this no single method is in general use. However many ways there may be of wrapping a 1-lb. lump of butter in a rectangular piece of paper, it is certain that each is employed by some maker.

The quality of the paper used for wrapping butter is of considerable importance. The ordinary so-called greaseproof papers are soon reduced to a pulpy condition by contact with moisture, and, as butter contains up to 16 per cent. of water, these papers are not suitable for the purpose. They tend to break up when being removed by the housewife, leaving fragments of paper adhering to the butter. A vegetable parchment, on the other hand, is not affected by moisture in this way. Under a National Mark scheme for butter, it would be necessary to prescribe the quality of paper to be used for wrapping pre-packed portions and for lining bulk packages, and it is suggested that only vegetable parchments should be permitted.

The paper used for wrapping butter on the farm varies considerably in quality. It is rarely printed with the name of the maker or with any design as is the case with pre-packed creamery and factory butters. The common practice is to buy the paper in plain sheets and cut it up by hand as required. Frequently, so little is used that the butter is not completely covered. Apart from paper, the use of small returnable cloth napkins for wrapping butter was not uncommon until quite recently; dock, cabbage and rhubarb leaves are still occasionally used in remote country districts.

In country districts, distinctive methods of making-up and wrapping appeal to the consumer; they are an indication of farm manufacture and, in consequence, suggest freshness and good flavour. In urban areas, on the other hand, uniformity, both in

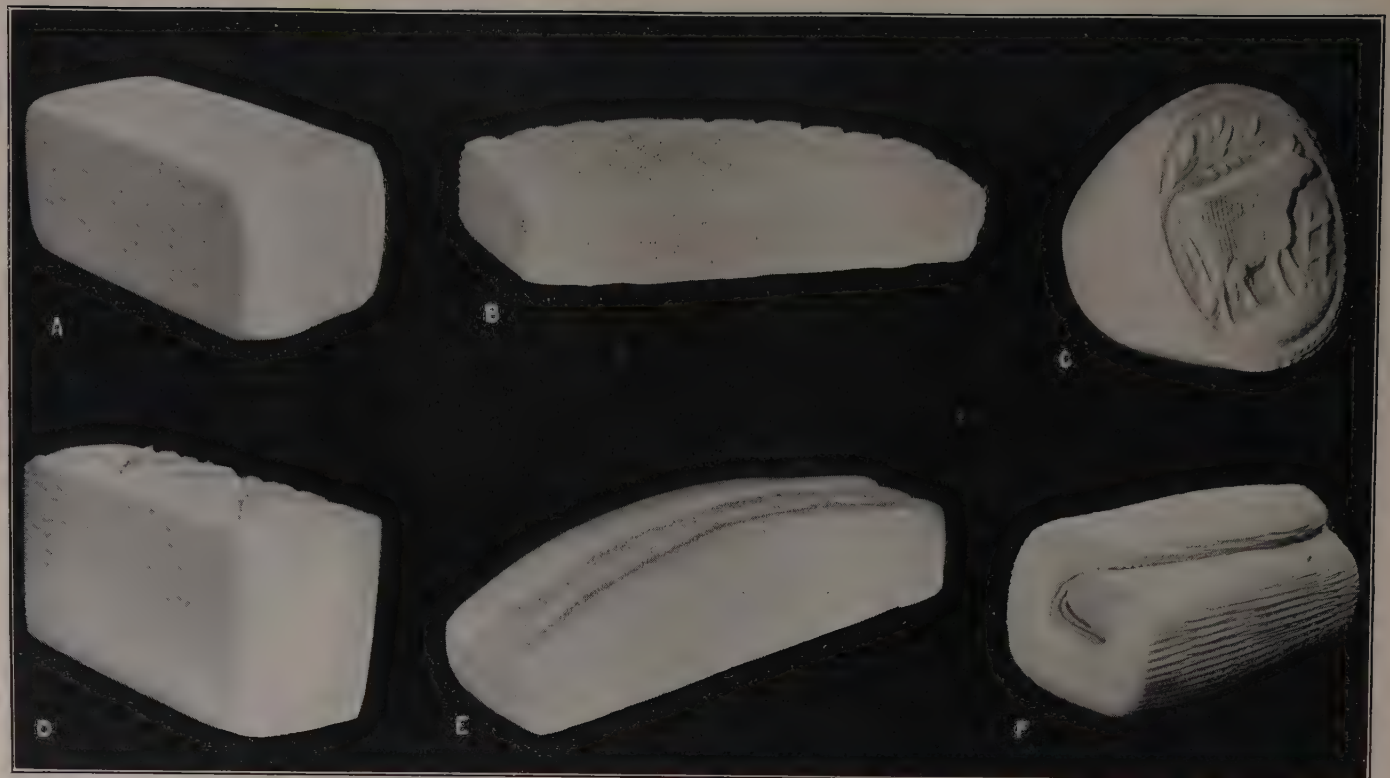

FIG. 29.—Farm butter shapes and patterns. (*a*) Isle of Wight. (*b*) Lincolnshire, (*c*) West-country print, (*d*) Midlands, (*e*) Huntingdonshire, (*f*) Monmouthshire.

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FIG. 30.—Farm butter shapes and patterns. (*a*) Yorkshire (W.R.), (*b*) Cambridgeshire, (*c*) Worcestershire, (*d*) S. Wales, (*e*) Cumberland, (*f*) Devonshire.

FIG. 31.—Automatic butter moulding, wrapping and check-weighing machine.

FIG. 32.—Machine-wrapped creamery butter.

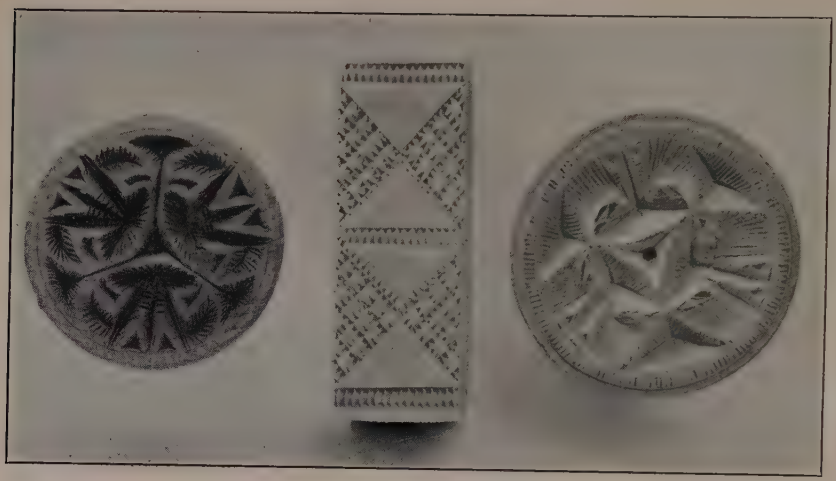

FIG. 33.—Butter prints.

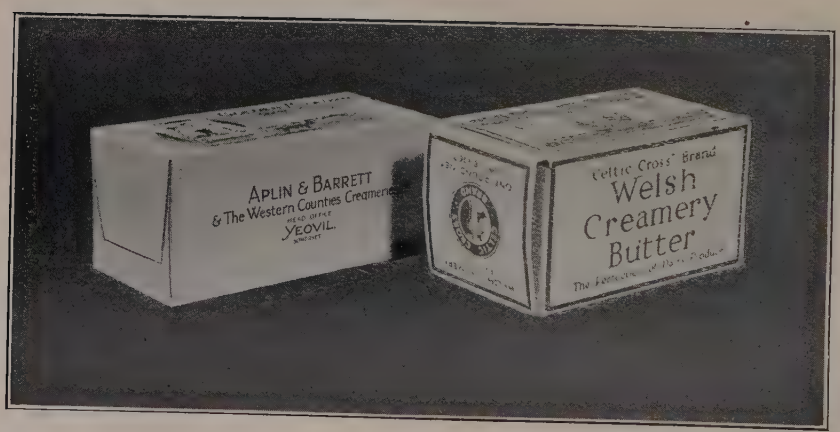

FIG. 34.—Pre-packed butter in cartons.

the quality of the product and its presentation, is essential to the continuous satisfaction of the buyer. Diversity of make-up is thus a handicap to the marketing in urban centres of farm-produced butter from districts where production is in excess of local needs.

Some creameries and factories which pre-pack butter enclose it, after wrapping in paper, in thin, folding cardboard cartons each holding ½ lb. or 1 lb. and printed with advertising matter (Fig. 34). Cartons and chip boxes are also used by farm butter-makers for postal trade; cartons for this purpose are necessarily made of stouter material. Under a National Mark scheme for creamery butter, the Ministry might license creameries to incorporate the National Mark in the design of private wrappers and cartons.

(ii) Imports.

Practically all imported butter arrives in bulk. A small quantity of Irish Free State and Danish butter is imported pre-packed, but imported butter sold in this form is generally pre-packed in this country for retail sale.

In practically all important exporting countries, the dimensions and materials of packages that may be used for export butter are prescribed by regulations, as part of the measures taken by the country concerned to safeguard the reputation of its product in overseas markets.

Three main types of package are used in the export trade. All butter from the Southern Hemisphere arrives in rectangular wooden boxes containing 56 lb. (Fig. 35). In the Irish Free State, a 56-lb. wooden box of truncated pyramid shape is mainly used (Fig. 36). From European countries and, to some extent, from the Irish Free State, butter is exported in wooden casks.

The standard box employed in New Zealand is an example of the wooden boxes in use in the Southern Hemisphere. The New Zealand regulations setting out the specification for standard butter boxes are as follows:—

SPECIFICATION FOR STANDARD 56-LB. RECTANGULAR BUTTER BOX.

No person, whether as principal or agent, shall, excepting with the prior written consent of the Minister, export, or pack for export, beyond New Zealand any butter except in standard boxes—that is to say, rectangular boxes complying with the following requirements:—

(*a*) The inside dimensions shall be 15⅛ in. long, 10¼ in. wide, and 11¼ in. deep, and the sides, tops and bottoms shall be of timber ½ in. in thickness; or

(*b*) The inside dimensions shall be 15⅛ in. long, 10⅝ in. wide, and 10⅞ in. deep, and the sides, tops and bottoms shall be of timber less than ½ in. in thickness.

(*c*) The minimum thickness of the ends of all boxes other than those of the Saranac type shall be—

(i) ½ in. if of silver-beech; or

(ii) ⅝ in. if of timber other than silver-beech.

(*d*) The outside measurements and the binding shall be as approved.
(*e*) The ends, sides, tops and bottoms shall be single pieces of timber; provided that matched boards, glued or lock-joined together, shall be regarded as single pieces.
(*f*) The ends shall be planed smooth on the outside, or of veneer finish. The outer surfaces of the sides, tops and bottoms, and the inner surfaces of the ends, shall be planed smooth, cut with a fine band-saw, or of veneer finish.
(*g*) The timber shall all be well seasoned, and free from cracks, loose knots, pockets of resin and other defects capable of allowing the contents to suffer damage.
(*h*) No nails other than cement-coated nails shall be used.
(*i*) The outsides shall be clean.

The Saranac type of box referred to above is made without nailing and is held together by bands of wire laced through staples (Fig. 37). It has the advantage of permitting the use of lighter timber and yet being adequate in strength. As much of the wood required for butter boxes has to be imported into New Zealand, economy in its utilization is important.

The New Zealand regulations allow a certain amount of latitude for experiment by manufacturers in the endeavour to find an inexpensive box suitable for exporting butter, but any departure from the above specification or any innovation must receive official approval, which is only given after a satisfactory report from an official grader.

The specification of the Irish Free State box (Fig. 36) is as follows :—

SPECIFICATION FOR STANDARD 56-LB. PYRAMID BUTTER BOX.

Timber.—Well-seasoned wood as free as possible from odour, resin and knots, planed smooth, and with edges either planed or cut with a fine saw.

Thickness of Material.—9/16th inch full.

Number of Pieces in Box.—Sides, ends, bottom and lid to be made up of two pieces each, tongued and grooved.

Break.—To be not less than $2\frac{7}{8}$ in. (inclusive of the tongue or groove).

Nails.—Cement-coated steel wire nails of the undermentioned numbers, lengths and gauge to be used :—

Number of nails attaching side to end of box, not less than 7 ; length of nail not less than $2\frac{1}{4}$ in. ; gauge 13.
Number of nails in bottom, 12 ; length of nail, $1\frac{1}{2}$ in. ; gauge 13.
Number of nails in lid, 8 ; length of nail, $1\frac{1}{2}$ in. ; gauge 13.

Lid.—Lid to cover box exactly without projecting over sides or end.

Internal Dimensions.—Bottom, 11 × 11 in. ; top, 12 × 12 in. ; depth, 13 in.

Subject to a tolerance of 1/16th in. in any dimension to cover all allowances for errors in cutting the timber.

In European butter-exporting countries and, to some extent, in the Irish Free State, butter in bulk is packed in wooden casks (or kiels) (Fig. 12). The usual size is that containing 1 cwt. (50 kilograms), but sizes containing 84, 56 (keg) and 28 lb. are also used to a small extent. The casks are made of beechwood with, usually, 20 to 24 staves bound by split willow hoops. The following specification for casks that may be used for export from the Irish Free

State will serve as an example of the type of package generally used in Europe :—

SPECIFICATION FOR STANDARD 112-LB. BUTTER CASK.

Cask to be made of best beechwood, thoroughly seasoned or kiln-dried.

Internal Dimensions.—Diameter : $13\frac{3}{8}$ in. at head and bottom, and $15\frac{3}{4}$ in. at bulge. Distance from the upper surface of bottom to the lower surface of head : $19\frac{5}{8}$ in., subject to a tolerance of $\frac{1}{8}$ in. in any dimension to cover all allowances for errors in cutting the timber and making up the cask.

Hoops.—Eight 6-feet "half-hoops," made of white willow, peeled, to be used on each cask. The use of twigged or notched hoops is optional.

Heads and Bottoms.—Head and bottom to be made of two or three pieces cut $\frac{1}{2}$ in. thick with $\frac{7}{16}$ in. finish ; the pieces forming the head and bottom respectively to be well dowelled together ; corrugated fasteners must not be used.

Fittings of Heads and Bottoms.—The heads and bottoms must fit properly into the crozes so that when the casks are filled the heads or bottoms will not come loose in transit.

Weight of Finished Cask.—The weight of the finished cask to be not less than 13 lb.

Butter boxes or casks are in all cases lined with parchment paper before filling and, in the Irish Free State, are first sprayed with paraffin wax.

PART III. THE BUTTER TRADE.

CHAPTER VIII.—COUNTRY WHOLESALING.

(i) Sale by Producer to Retailer.

The sale of butter by farmers to retail grocers in villages and country towns is of considerable importance. Besides the ordinary method of sale for cash, it is a common practice for the farmer's wife to barter produce with one or more local grocers. She buys from them her household requirements of groceries and hardware and hands over her eggs and butter in exchange. Contra accounts are kept by the grocer and settlement is made periodically, sometimes at long intervals. The grocer will generally accept farm produce under a barter arrangement of this kind, even where the quality of the produce is inferior, provided that the value of the purchases made at his store makes it worth his while to take the additional trouble and risk of loss that are involved; otherwise, he limits his acceptances and may altogether decline to do business with producers of inferior butter. At the peak of the producing season, the quantities of butter offered to him are often more than he can sell over the counter, and he may have to find an outlet for the surplus among blenders or toffee or biscuit manufacturers; or he may pickle the best-keeping supplies for sale in the winter. If he limits his acceptances at the season of heavy supply, the farmers transfer part of their custom elsewhere. It is not unusual to find farmers dealing with several local grocers and, at the peak of the season, offering produce to them all in exchange for other goods.

Country shopkeepers are not, on the whole, willing buyers of farm butter. Many of them would prefer not to handle it and only do so for the sake of increasing their sales of groceries or in order to secure the eggs which the butter producer also has to offer; indeed, some buyers refuse to accept butter unless it is accompanied by a reasonably large quantity of eggs.

(ii) The Higgler.

A large proportion of farm-made butter is disposed of to travelling collectors, locally known as higglers, hucksters or regrators, many of whom are primarily egg dealers; in fact, the farmer's wife generally insists that the dealer who buys the eggs should also take whatever butter she has to offer. The higgler agrees to take the butter in order to obtain the eggs, but attaches little or no value to the butter trade itself. In many cases, higglers would, in fact, prefer to be relieved of it, owing to the variations in the quantity, quality, character and keeping-property of the supplies.

The higglers call at the farms with carts or motor-vans once or twice weekly and buy up the butter on offer. Many have regular rounds and in such cases it is common for the butter to be made

on the day before the higgler calls. When visits are only made weekly, there is considerable risk, in summer, that the cream may become over-ripe before churning, so that the butter tends to be of inferior flavour and keeping-quality.

The butter is received by the higgler ready made up and wrapped for retail sale and is passed on by him in the same wrappers to his customers. Butter intended for re-sale to blending factories, however, is usually bought in the lump.

The farmer's wife, who is herself generally the maker of the butter, resents being offered a lower price than her neighbour. To preserve good relations, therefore, the dealer usually pays a flat rate for all butter, irrespective of quality, though if it shows an obvious excess of moisture of a milky nature—an indication of imperfect washing—a small deduction may be made. The flat rate offered is, of course, such as to provide the dealer with a sufficient margin on the re-sale of the best quality to cover his losses in disposing of the worst for manufacturing purposes. The weekly price is necessarily influenced to some extent by local market prices, but the actual price paid rests almost entirely with the dealers. In some cases, the traditional arrangement of fixing the price of butter at the same rate per lb. as that of eggs per dozen is still followed.

This method of marketing affords little or no incentive to quality production, and it is not surprising that there should be much indifference on the part of the makers to the quality of their product.

Higglers generally buy on their own account for re-sale on local markets or direct to retailers and, in some cases, to consumers. A few also sell to, or act as agents for, blending factories. In disposing of the butter, the dealer attempts, as far as possible, to keep each customer, whether shopkeeper or consumer, supplied with butter from the same farm. Variation in the output from each farm at different seasons and even from one week to another makes this a matter of considerable difficulty. Customers who have been receiving the best quality when supplies are at their peak naturally want to continue having that particular product, which is usually identifiable by its design or method of wrapping, and they are apt to complain of changes which are almost unavoidable when supplies become insufficient to go round. To avoid this, dealers may sell some of the best butter, with the surplus, to manufacturers, so as to prevent consumers from developing a regular demand for it that cannot be met later on. This is some justification for the flat-rate payment for good and bad alike. In the scarce season, some dealers, to satisfy their more fastidious customers, buy a certain quantity of blended butter made up in the fashion of farm butter and in plain wrappers. Others have gone into the blending business themselves.

(iii) The Country Produce Market.*

The importance that once attached to butter in country markets is evidenced by the number of " butter crosses " which still stand in the market towns of England and Wales. Some of these " crosses " took the form of roofed buildings open on all sides and provided with steps on which the farmers' wives used to sit on market days with baskets of dairy and poultry produce (Fig. 1 —frontispiece). Others were enclosed buildings with fixed or movable benches on which the produce could be placed (Fig. 38). Country markets are still of some significance as assembly points for home-produced butter ; but, besides the diminution that has taken place in farm butter-making through the increased demand for liquid milk and the development of centralized manufacture of milk products, improved transport facilities have extended the range of the dealers in collecting from farms and the growth of population has improved the opportunities for sale to local grocers. In most cases, the markets have thus lost their importance so far as butter is concerned.

In the privately owned produce markets and in the public markets in many districts, butter is sold by auction (Fig. 39), but in some parts of the country sale by private treaty in public markets is more usual. The methods of presentation of butter, as of other produce, in markets are very diverse and generally unsatisfactory (Fig. 40). Butter is commonly made up for sale in half-pounds or pounds of various shapes and designs, according to local custom, and wrapped in greaseproof paper, a few portions in each lot having the paper drawn back to expose the surface to view (Fig. 41). In some markets, sales are almost entirely to consumers ; in others, partly to consumers, partly to local retailers and partly to wholesalers' or blenders' agents. In markets where sales are mostly retail, the makers often develop a regular trade with customers who seek a supply of butter from the same dairy week by week. In such markets, however, the dealer is often a stallholder himself and competes directly with producers. Frequently, the market is only used by producers for disposing of odd quantities surplus to sales at the farm door.

Charges for the use of markets take the form either of rents for the space occupied or of tolls of, generally, from 1*d.* to 3*d.* per basket of butter ; sometimes a combination of these charges is made. The quantity of butter exposed for sale by individual producers ranges from a few pounds up to a maximum of 50 or 60 lb., but the average lot is in the neighbourhood of from 8 to 10 lb.

Prices in markets show wide differences according to quality, the butter offered varying from rancid, overkept, badly made surpluses to good-quality supplies.

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* See also *Report on the Markets and Fairs in England and Wales*, Economic Series Nos. 13, 14, 19, 23 and 26.

FIG. 35.—New Zealand standard butter box.

FIG. 36.—Irish Free State standard butter box.

FIG. 37.—New Zealand saranac type butter box.

FIG. 38.—Barnard Castle Butter Cross.

FIG. 39.—Sale of butter by auction.

FIG. 40.—Farm butter displayed for sale in local market.

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FIG. 41.—Butter baskets.

FIG. 42.—Retail butter market.

(iv) The Blender.

The assembly of home-produced butter by blenders is, for the most part, a simple process. Except in South Wales, where assembly is to some extent organized, butter sold to blenders is usually delivered direct by the producers. In South Wales, however—i.e., in Cardiganshire, north Pembrokeshire and north Carmarthenshire—the butter blenders usually assemble their supplies through country agents—mainly local grocers and keepers of general stores. Most commonly, the butter is delivered to these agents by the farmers or by carriers on market day, that is to say, usually once a week ; in some cases, the agent establishes outlying collecting depots, which are open once a week for, say, two hours, and to which supplies are delivered by producers. Occasionally, also, the agent may collect butter, together with eggs and other produce, from the farms at the same time that he delivers groceries and other goods. Supplies are received in lump form, unsalted, usually wrapped in butter-muslin and packed in wooden boxes, tubs, baskets or hampers. They are forwarded by the agents to the blenders in bulk, without processing, usually once a week.

At the blending depots, the butter is blended, with or without the addition of imported butter, and is then re-packed for sale in returnable oak tubs and, if necessary, put into cold-store to await dispatch to retailers.

The blender, like the higgler, generally pays a flat price but may occasionally make some deduction if the butter contains excessive moisture of a milky nature.

CHAPTER IX.—ORGANIZED MARKETING.

(i) General.

In countries where the butter industry largely depends on export markets, economy can be effected if a number of creameries work together for the sale of their product overseas. Besides securing economies in selling, it is possible by collective action to regulate the dispatch of produce to market in accordance with demand, to secure standardization, to carry out advertising on a large scale and to perform other functions which individual creameries are not in a position to perform for themselves. In most of the principal exporting countries, organizations have been formed for the purpose of rendering services of this nature. These organizations are of two kinds—co-operative selling organizations which actually sell their members' butter, and representative non-trading organizations controlling marketing policy.

(ii) Co-operative Marketing.

Large-scale co-operative selling organizations have been established by groups of creameries in a number of exporting countries,

including Denmark, Finland, New Zealand, the Netherlands and the Irish Free State. These organizations, besides selling their members' butter, exercise control over quality and carry out advertising in export markets.

(a) **Denmark.**—In Denmark, there are 11 co-operative butter export associations, each comprising a group of creameries which are themselves for the most part co-operative, though some are under private ownership. The number of creameries in each association ranges from 50 to about 100. The export associations assume the whole function of selling their members' produce. Sales are made generally direct to importers and chain stores, but in some cases to wholesalers through agents in the importing country working on a commission basis. Many of the associations' customers have standing orders for regular weekly quantities, as much as 50 per cent. of the output of some associations being sold in this way. For other sales, the associations begin telegraphing offers on Tuesday and sales are completed by Friday. As a rule, all stocks are cleared each week.

The basis of the associations' selling prices is the official weekly Copenhagen butter quotation, which is a feature of the co-operative marketing of Danish butter. This weekly quotation is arrived at by a Committee consisting of representatives of the creameries, of the butter export associations, of the private exporters, and of the English buying-houses that have branches in Denmark. Each week, the creameries and the export associations on the one hand, and the private exporters and importing houses on the other, first meet separately and, taking into account the previous week's sales and the market tendencies, arrive at suggestions as to the price for the ensuing week. The whole Committee then meets and considers the two prices suggested. If they are unable to agree on a figure, then the price which is nearer to the previous week's official quotation is taken as the official quotation for the ensuing week. With this figure as a guide, creameries and export associations are then able to make offers to their customers. Where there are standing orders, it is agreed beforehand that the price paid will be on the basis of the official weekly quotations.

Independently of the official testing carried out in connexion with the use of the "Lur" brand, the butter export associations operate a system of quality-assessment of their members' butter.* Payment is made to the creameries on the basis of the weekly official quotation, with a bonus for quality in proportion to the score attained. These bonuses, however, are usually small. Some export associations pay out the bonus to their members each week; others, in a lump sum at the end of the year.

The associations do not aim at earning profits but merely at covering their working costs and overhead charges by deductions from the prices paid to the creameries for their butter. The creameries, in turn, pay the farmers for their milk at a rate, per

* See Chapter V.

unit of butter-fat, varying each week according to the official Copenhagen butter price quotation.

Of the total Danish butter output, 40 per cent. passes through the co-operative butter export associations, and the proportion tends to increase yearly.

(b) **Finland.**—The largest single instance of a co-operative butter-selling organization in Europe is the Central Co-operative Butter Export Association (Voinvienti-oscuuslukeValio, commonly known as " Valio ") of Finland. This Society has in its membership about 500 creameries and sells 90 per cent. of the butter produced in Finland. It maintains an office in Hull and also has agents in Amsterdam, Antwerp, Berlin, Oslo and Stockholm. Independently of the State grading service, the Association operates a service of inspection* of its members' butter sent in for export, and payment is made for supplies on a quality basis. The Association also provides facilities for technical education and carries out research into butter-making technique. It thus endeavours to raise the quality of the produce of its affiliated creameries to the highest possible level.

(c) **The Irish Free State.**—The most recent co-operative butter marketing enterprise was launched in the Irish Free State in 1928, but was short-lived. This organization, known as the Irish Associated Creameries, Ltd., commenced operations in 1928, with the support of 80 per cent. of the Free State creameries, but, since the remaining 20 per cent. included some of the largest, it actually handled less than half of the annual butter output of the country. In addition to selling the produce of its member-creameries and trying to extend the area of sale of Irish creamery butter in Great Britain, an endeavour was made to stabilize the price by holding back supplies at the period of peak production when markets appeared overloaded.

The method of sale adopted by the Irish Associated Creameries was to appoint agents in the principal centres—London, Liverpool, Cardiff and Belfast—to sell at the prices fixed by the Committee of the Association. These agents received salaries and were thus virtually employees. This policy was designed to displace the method of selling on consignment. No butter was shipped by the Irish Associated Creameries unless it was already sold. Payment was generally made to the creameries at a flat rate based on the average price received for all supplies, though premiums had to be paid to certain creameries which enjoyed a special demand for their butter ; it was also found advisable, with the object of raising the standard of quality, to make deductions from the flat rate for any butter that could not be classed as " Choicest." The advantages arising from the policy of the Association were, however, reaped equally by those creameries which continued to

* See Chapter V.

sell independently and, as they had no share in the running expenses of the organization, they were able to obtain somewhat higher returns than those received by the affiliated creameries. This led to the organization going into voluntary liquidation in 1930.

A Tribunal was set up by the Irish Free State Government in 1930 to enquire into and report on the marketing of butter produced in the Dominion. In view of the liquidation of Irish Associated Creameries, this Tribunal issued an interim report* in December, 1930. The Tribunal found that there was a practically unanimous opinion in the Irish dairy industry against a return to the old methods of selling and recommended the formation of a Society, of which every co-operative creamery should become a member, to secure co-ordination of the various creameries in the marketing of their output. No action has, however, been taken on this Report up to the present and the creameries have returned to individual selling.

(d) **The Netherlands.**—In the Netherlands, there are 7 co-operative butter marketing societies, which, it is estimated, handle roughly half of the total output of Dutch butter. The system of operation does not differ greatly from that in Denmark. The Dutch societies, however, buy butter outright on a quality basis from makers whether they are members or not. They engage in both the domestic and the export trade, the latter being by far the more important.

(e) **New Zealand.**—Two instances of large-scale co-operative marketing organizations for New Zealand dairy produce—the New Zealand Producers' Co-operative Marketing Association and the New Zealand Co-operative Dairy Company—were described in the Report on the marketing of cheese.† Both organizations are combines of co-operative dairy factories and both have importing houses in England associated with them. The English Co-operative Wholesale Society holds about half the capital in the importing house—New Zealand Produce Association, Ltd.—associated with the first-named organization.

(iii) Regulated Marketing.

The statutory organizations—known as Control Boards—that exist in New Zealand, Australia and South Africa for the purpose of controlling the marketing policy of the dairy industry in those countries were described in the Report on the marketing of cheese.‡ Briefly, these Boards, which represent milk producers, factory owners, distributors and the State, and are financed by levies on all butter and cheese exported or manufactured, endeavour to

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* Interim Report of the Tribunal to Inquire into the Marketing of Butter : The Stationery Office, Dublin.

† Economic Series No. 22, pp. 104–5.

‡ Economic Series No. 22, pp. 105–6.

improve marketing without engaging in trade. The New Zealand Board,* for example, *inter alia*, controls shipments by allocating shipping space, negotiates freight and insurance rates and aims at improving the quality of New Zealand dairy produce and the shipping, handling and cold-storage facilities. Through its London agency, it keeps in touch with market tendencies in this country and carries out publicity for New Zealand supplies.

CHAPTER X.—THE WHOLESALE TRADE.

The distribution of butter in the large consuming centres is carried out by firms which handle provisions of various kinds but particularly dairy produce. The importer generally deals in both butter and cheese and sometimes in bacon and eggs. The wholesaler's business generally comprises the whole range of groceries and provisions.

In the wholesale distribution of imported butter, the Provision Exchanges in the principal ports, particularly London, Liverpool, Bristol and Glasgow, fulfil an important function not only as rendezvous for buyers and sellers but in providing machinery for the standardization of trade practices, for arbitration in disputes and for the collection and dissemination of business information.†

(i) The Importer.

Butter importers are concentrated at the ports. London is the chief centre of the imported butter trade ; most of the big importers established in London have branches at other ports such as Liverpool, Manchester, Newcastle and Glasgow.

The importer brings together supplies from overseas countries and feeds the market in accordance with demand. This involves a number of services, including the advance of credit to the shipper or overseas producer, the provision of storage accommodation, the finding of markets for overseas sellers and the filling of orders for buyers in this country. Some importers re-work and pre-pack imported butter before resale.

Importers include both principals buying outright on their own account and agents (or brokers) working on a commission basis. Few importing firms confine themselves strictly to one or other type of transaction.

The basis of trading differs slightly as between imports from European sources and from the Southern Hemisphere, respectively. Imports from Denmark, for example, are mainly purchased outright on a f.o.b. basis, but in the case of New Zealand supplies, sale on commission is more common. This difference is accounted

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* See Fourth Report of the Imperial Economic Committee on the Marketing of Dairy Produce, Cmd. 2725/1926.

† See also Economic Series No. 22, pp. 112–3.

for largely by the distances of the two countries from the United Kingdom market. The long distance over which butter has to travel from New Zealand increases the risk involved in outright purchase.

If butter is bought outright, the transaction may be either on a c.i.f. or f.o.b. basis. The merchant bears all the risks of marketing the butter, including those of deterioration of quality and a falling market, and depends for his profit on his ability to buy and sell to advantage. If handled on commission, butter may sometimes be dispatched direct from the exporter to the buyer on the advice of the importer through whom the transaction has been effected. Sale on commission frees the importer from any responsibility except that of bad debts ; he receives as remuneration a percentage of the selling price, the price realized being returned to the shipper or exporter less commission and other charges, the rate of commission being from 2 to 2½ per cent.*

The importer generally sells to wholesalers, blenders and large retailers such as multiple-shop firms ; in some cases, however, transactions may take place between importers, that is, between merchants and brokers—for example, when the buyer does not wish to reveal his presence on the market. Some of the larger multiple-shop firms as well as the Co-operative Wholesale Society act as importers on their own account. Thus, 30 per cent. of the Danish exports to this country are bought by two such firms, which have their own buying organization in Denmark and are represented on the Committee that fixes the Copenhagen weekly butter quotation. Other chain stores buy direct from the Danish Butter Export Associations. Similarly, Irish butter is bought by large retailers direct from the creameries. The connexion of the Co-operative Wholesale Society with the New Zealand dairy industry has already been mentioned.

Most importing firms employ one or two travelling salesmen, but the bulk of the business is done by letter, telephone or telegraph, or by personal selection by buyers at wharves and warehouses. All sales are by private treaty. The general conditions of trade between importers and wholesalers are payment within 30 days, with a discount, of which most buyers take advantage, of 2*d.* in the £ for payment within 7 days.

(ii) The Wholesaler.

Home-produced farm butter is not handled by town wholesalers ; nor is there much wholesale handling of home-produced creamery or factory butter, most of which is dispatched direct from the manufacturer to the retailer, carriage paid. A flat price is charged which applies to all places throughout the country, irrespective of distance from the manufacturing depot, and includes the cost

* See also Fourth Report of Imperial Economic Committee, page 62. Cmd. 2725/1926.

of pre-packing and carriage. The same price per pound also holds good whether the consignments are large or small. The retailer is thus encouraged to replenish his stocks frequently, often even daily, and much of the goodwill value of the blended butter trade is based on freshness of supplies. The slogan "Fresh supplies daily" appeals to the consumer and the possibility of ordering from day to day is a great convenience to the shopkeeper. In nearly all cases where a connexion has been established between factory and retailer, standing orders are placed for regular deliveries of stipulated quantities at frequent intervals, but the retailer is able at any time, by letter or telegram, to obtain extra quantities or stop deliveries. The success of distribution direct to retailers largely depends on prompt attention to orders in this way. Contact with the retailer is maintained by travellers or agents. The larger firms maintain their own representatives; the smaller ones employ travellers who work on commission and represent several firms.

Town wholesalers, who are principally concerned with imported butter, are mainly located in the larger centres; many of the biggest firms maintain branches in several towns, particularly at the ports, such as London, Liverpool, Bristol, Newcastle and Glasgow. They are usually general provision merchants, handling a wide variety of commodities, the distribution of butter being carried out in conjunction with other goods.

The functions of the town wholesaler are to buy in bulk, hold in stock against the needs of his customers and to break bulk and deliver as required. These involve the maintenance of a travelling sales staff, the provision of storage accommodation and the advancing of credit to buyers.

The town wholesaler may be either a primary or a secondary wholesaler. The primary wholesaler purchases for resale to secondary wholesalers or to retailers. The secondary wholesaler usually operates on a comparatively small scale and acts as a link between the smaller retailers and the primary wholesaler. He is frequently a large retailer in a provincial centre and sells in the smaller towns and villages in the neighbourhood.

Sales by the wholesaler to the retailer are by private treaty on personal inspection or sample, or simply on order by post, telephone or telegraph without previous examination of the goods. The wholesale trade is conducted on both cash and credit terms, but the generally accepted terms are payment in 28 days with a discount of 2*d.* in the £ for payment within 14 days.

CHAPTER XI.—THE RETAIL TRADE.

(i) Retailing by the Producer.

In country districts, consumers frequently buy their butter at the farm. The maker thus secures a somewhat higher price and the consumer has the satisfaction of knowing the source of

the supply. In the principal butter-making districts, some farmers have an established trade in butter and eggs with consumers in neighbouring towns, supplies being delivered once or, in some cases, twice a week. Producers who have retail rounds of this kind may find it necessary at times—in winter, for example—to augment their output with bought supplies which are made up to resemble their own product. Some producer-retailers of milk make butter from occasional surplus milk for sale on their milk rounds.

Although the cash-on-delivery postal service is not used to any extent for butter, there is some consignment of butter by post from producers to regular customers at a distance. The buyer can rely upon the butter being fresh, genuinely home-produced and according to taste, and is prepared to pay not only the price charged by makers of good reputation but also the cost of postage, which, on parcels not exceeding 2 lb. in weight, amounts to 6*d*. The fact that there is a postal trade indicates that there is still a demand for the best farmhouse butter, which is inadequately catered for by retail shops in towns remote from butter-making districts owing to the difficulty of obtaining supplies. But the number of people who are prepared to go to the expense of buying butter by post is limited and there appears to be little scope for extension of this trade.

In the larger urban retail markets, the bulk of the butter trade is done by local retailers, but the retail markets in certain butter-producing districts afford an opportunity for butter-makers to sell their produce direct to consumers (see page 74 and Fig. 42). In the latter case, consumers commonly make regular purchases week by week from the same maker. The price is generally more or less uniform throughout the market in spite of big differences in quality.

(ii) The Town Retailer.

There are no shops devoted exclusively to the sale of butter, though cheese shops are to be found here and there. On the other hand, a greater variety of retailers handle butter than cheese. Thus, besides being regularly stocked by grocers and provision merchants, chain-stores, co-operative stores, departmental stores and dairymen, it is also sometimes sold by fishmongers, game dealers, butchers and confectioners.

(a) **Grocers and Provision Merchants.**—The size of the business determines how many types of butter are stocked, but most retail grocers and provision merchants always stock at least two kinds of butter in bulk from which each customer's purchase is weighed out, knocked-up and wrapped. Where a wider range of bulk butter is stocked, butters of different degrees of saltness, of different countries of origin and of different grades may be included. A survey carried out by the Empire Marketing Board in Notting-

ham in 1931* showed that 48 per cent. of independent retailers in that city stocked 2 types of butter, 27 per cent. only one type, 19 per cent. 3 types and 6 per cent. 4 types. Various brands of pre-packed butter may also be sold. Butter does not give much scope for selective buying by the retailer, though discriminating retailers always endeavour to obtain the product of the same creamery instead of ordering only according to quality-grade and country of origin. In small towns and villages, locally made farm butter, pre-packed at the farm, may also be on sale ; where this is so, considerable attention has to be paid to the preference of individual customers.

(b) **Chain and Co-operative Stores.**—Butter is one of the main commodities sold in the provision departments of chain stores and industrial co-operative societies. It lends itself to large-scale buying and can be sold at a relatively narrow margin of gross profit. These stores generally stock a wider range of types than the private grocer or provision merchant. The Empire Marketing Board survey referred to above showed that in Nottingham, 52 per cent. of multiple shops stock 2 types of butter, 41 per cent. 3 types, 5 per cent. 4 types and 2 per cent. only one type. Where pre-packed butter is sold, these firms generally sell their own proprietary brands blended and pre-packed in their own factories ; but usually only a very small proportion of pre-packed butter is sold. Until recently, it has been the practice for bulk butters of one or two prices and one or two degrees of saltness to be stocked without specifying the country of origin. Under the Merchandise Marks (Imported Goods) No. 1 Order, 1932, after June 17, 1932, the origin must be declared.

(c) **Departmental Stores.**—The feature of the departmental store is the complete range of commodities stocked. Thus, the range of bulk butters sold is as wide as possible ; butters of all degrees of saltness and from many countries are stocked and, generally, at least one cheap line is included for advertising purposes. A wide range of pre-packed butters is also generally stocked, including more than one brand of blended butter, one or two brands of re-worked, pre-packed, imported or English creamery butter and, possibly, farm butter.

(d) **Other Retailers.**—The butter sold in dairymen's shops is for the most part bought in pre-packed form ; in some cases, however, a proportion may be bought in bulk and made up and wrapped on the premises for sale both on the milk rounds and in the shops. This butter is sometimes made up in blocks by hand so as to resemble the farm product.

Fishmongers and butchers who handle butter confine their trade to pre-packed butter and nearly always to farmers' butter of special quality, which is usually obtained to the order of certain customers.

* E.M.B. Report No. 48, 1932.

Confectioners, who use a certain amount of butter in the making of pastries, sometimes obtain supplies of higher grade butter pre-packed for sale over the counter.

In the retail markets that exist in many towns, particularly in the Midlands and North, butter is sold on the stalls of egg and poultry dealers, grocers, butchers and sometimes fruiterers. Stalls devoted exclusively to butter are not found ; cheese stalls, on the other hand, are to be found in some markets.

(iii) Sources of Supply.

Imported butter in bulk is bought by retailers from primary and secondary wholesalers and, in the case of the larger firms, direct from importers. As has been shown, the multiple-shop firms of retailers frequently import on their own account. Consumers' co-operative societies largely buy from the Co-operative Wholesale Society, whose methods of obtaining supplies have been referred to.

Supplies of home-produced factory and creamery butter are obtained direct from the makers, mostly pre-packed and often in wrappers or containers printed with the retailer's name or design. Supplies of farm butter are usually delivered direct to the retailer by farmers or by dealers who collect from farms, though in country towns the grocer himself sometimes collects the butter from the makers.

(iv) Methods of Sale.

Notwithstanding some increase in the sale of pre-packed butter in recent years, most of the retail butter trade is still in bulk butter, which is weighed out in retail quantities and wrapped at the time of sale to the consumer. The consumer in many cases likes to have the butter weighed out from the block because it appears fresher ; from the retailer's standpoint, the extra trouble and expense involved are very slight, whereas, in a re-working and packing establishment, special staff and plant have to be employed for the purpose.

Box butter is turned out on to the back counter of the shop, unwrapped and often cut through several times with a wire to facilitate the removal of small pieces for weighing out. When the butter is turned out of a 1-cwt. cask, it is cut through and only one half is placed on the counter at a time. On the front counter, the butter is weighed and knocked up into shape on a marble slab by means of a pair of wooden "Scotch hands." The butter on the back counter is usually labelled with a description, sometimes including the country of origin, and is price-ticketed. As butter readily picks up particles of dust and dirt, part of the shop or counter is generally reserved for its sale along with other provisions such as bacon and eggs. There is usually a fairly quick turn-over in butter and, as a rule, it is not

exposed on the counter long enough to permit of any appreciable loss of weight or surface deterioration.

Ease of handling and selling makes pre-packed butter popular with retailers in a small way or with those whose butter trade is a side-line, whose turnover is slow, whose shop accommodation is limited and who are not in a position to employ skilled assistants. Pre-packed butter appeals to the consumer through its attractive packing and because it is a branded article of uniform character.

CHAPTER XII.—STATUTORY REQUIREMENTS.

The sale of butter in this country is governed by a number of statutory requirements.

(i) Sale by Net Weight.

Butter is one of those commodities which, under the Sale of Food (Weights and Measures) Act, 1926, is required to be sold by net weight. The net weight may include the weight of the wrapper when this does not exceed $2\frac{1}{2}$ drams.

The following conditions apply to pre-packed butter :—

(1) The butter must be made up for sale in quantities of 2 oz., or in multiples of 2 oz., up to a limit of 8 oz. ; in multiples of $\frac{1}{4}$ lb. from 8 oz. to 2 lb. ; in multiples of $\frac{1}{2}$ lb. from 2 lb. to 4 lb. ; or in multiples of 1 lb.

(2) The wrapper or container or a label securely attached to it must bear a true statement in plain characters of the minimum net weight of the contents, or, in any case where the weight of the wrapper or container is permitted to be included in the weight purported to be sold, of the minimum weight of the butter with its wrapper or container.

Butter that is not pre-packed must be sold in quantities of 2 oz., 4 oz., 8 oz., 1 lb., or multiples of 1 lb., unless it is either weighed in the presence of the purchaser and forthwith delivered to him, or is delivered to the purchaser accompanied by a legible statement of its weight.

(ii) Adulteration.

Under the Food and Drugs (Adulteration) Act, 1928, butter is defined as "the substance usually known as butter, made exclusively from milk or cream, or both, with or without salt or other preservative, and with or without the addition of colouring matter."* Two main kinds of adulteration of butter are possible—(*i*) the addition of water and (*ii*) the addition of other substances, particularly fats other than butter-fat.

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* It should be noted, however, that the Public Health (Preservatives, etc., in Food) Regulations, 1925 and 1927 (see page 89), prohibit the use of preservatives in butter, and certain colouring matters are also prohibited.

(a) **Water Content.**—Butter consists chiefly of butter-fat and water, and the consumer's interest is clearly that the proportion of butter-fat should not be lowered by the addition of water. In 1902, a Departmental Committee came to the conclusion,* after taking into account all the considerations involved, that a maximum limit of 16 per cent. of water could safely be prescribed. It was recognized, however, that it might not always be practicable for the butter-maker to know the moisture-content of his product or so to adjust his technique as to keep the moisture-content with certainty below the suggested maximum. Consequently, in the Sale of Butter Regulations, 1902, which were laid down subsequently to the Report of the Committee, a fixed maximum moisture-content was not prescribed but a presumptive limit of adulteration was set up instead ; that is to say, where the proportion of water in a sample of butter exceeds 16 per cent. it is presumed, until the contrary is proved, that the butter is not genuine by reason of the excessive amount of water which it contains. These regulations govern the position as regards the sale of home-produced farm and creamery butters and all imported butter, not subjected to treatment in a butter factory, which may have contained less than 16 per cent. of water on importation but to which water may have been added. If the vendor can prove that the butter is genuine, even though it contains more than 16 per cent. of water, he is not liable to conviction.

The position as regards butter on importation and factory butter is different. Under the Food and Drugs (Adulteration) Act, 1928, butter containing more than 16 per cent. of water may not be imported into this country. Under the same Act, butter factories —that is to say " premises on which, by way of trade, butter is blended, re-worked or subjected to any other treatment, but not so as to cease to be butter "—are not allowed to have on their premises butter when prepared for sale that contains more than 16 per cent. of water. For imported and factory butter, therefore, there is an absolute prohibitory limit and not a presumptive standard.

(b) **Other Substances.**—Developments early in the present century in the manufacture of vegetable fats resulted in butter being frequently adulterated with them. These fats, when properly prepared, are quite wholesome, but the purchaser of butter is held by law to be prejudiced by the substitution of cheaper substances of this kind for butter-fat. The measures taken to prevent adulteration of butter with other fats are of two kinds ; one aims at control of the establishments where butter is processed, the other provides for the infliction of penalties for the sale of butter which is found on analysis to contain other than the natural and proper constituents.

* Interim Report of Departmental Committee on Regulations for Butter. Cd. 944/1902.

Under the Food and Drugs (Adulteration) Act, 1928, a person selling as butter mixtures of butter with other fats commits the offence, referred to above, of selling to the prejudice of the purchaser an article not of the nature or not of the substance or not of the quality of the article demanded, or he may offend against the law as to the labelling of margarine. There is difficulty, however in detecting the presence of these adulterants when present in the proportions in which they are likely to be used. In consequence, under the same Act*, butter factories (in the legal sense†) must be registered with the Food and Drugs Authority. This registration is notified to the Ministry of Agriculture and Fisheries, whose officers have power of entry. Any oil or fat capable of being used as an adulterant that is found in the factory is deemed to be intended to be so used unless the contrary is proved. Premises are not permitted to be used as a butter factory if they form part of, or communicate otherwise than by a public street or road with, any other premises which are required to be registered in connexion with the manufacture or trade in margar ine, margarine-cheese or milk-blended butter. This has served to check adulteration in such establishments.

Another form of adulteration which became common early in the present century was the mixing or blending of butter with milk or cream. This substance—" milk-blended butter "—has therefore also been the subject of legislation. Under the Food and Drugs (Adulteration) Act, 1928,* this product may be sold only under a name approved by the Minister of Agriculture and Fisheries, and premises where it is manufactured or dealt in wholesale must be registered and open to the inspection of officers of the Ministry. As a result of this legislation, milk-blended butter has now almost entirely passed out of existence as a commercial product.

(iii) Substitution.

With the invention of margarine came the practice of selling that article as butter, quite apart from its use for the purpose of adulterating butter. Although the nutritive values of the two commodities are not widely different, margarine is cheaper and less palatable. Substitution of this kind, therefore, not only prejudices the purchaser but constitutes a form of unfair competition with the butter industry. Legislative measures have accordingly been taken in many countries to control the production and sale of margarine, and, where the butter-making interests had sufficient influence with the legislature, the trade in margarine has been subjected to drastic restriction or has even been forbidden.

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* These provisions were first introduced under the Butter and Margarine Act, 1907.

† See above.

In the United Kingdom, margarine is accepted as a legitimate foodstuff and standards of composition have been prescribed in regard to butter-fat and water content. Its manufacture, sale and importation were, however, regulated by the Sale of Food and Drugs Act, 1899, and the Butter and Margarine Act, 1907, which have since been incorporated in the Food and Drugs (Adulteration) Act, 1928. This Act forbids the admixture of more than 10 per cent. of butter-fat in the fat of margarine. It also requires the product to be clearly labelled with the unqualified description "margarine" at all stages of its distribution and sale, and specifies the sizes of the lettering to be used in various circumstances. It requires the registration of all factories and wholesale premises devoted to the production and sale of margarine and gives power to officers of the Ministry of Agriculture and Fisheries to enter these premises and to inspect the registers required to be kept by manufacturers and wholesale dealers showing the quantities and destinations of all consignments. A proportion of 16 per cent. of water is prescribed as the maximum permissible limit of moisture-content, and restrictions are imposed which are designed to make operative for imports substantially the same conditions as apply to the manufacture and sale of the home product.

A full account of legislation regulating the margarine trade in other countries will be found in a recent publication, entitled "Margarine as a Butter Substitute,"* but may be briefly summarized here.

In the Netherlands and in Denmark, the requirements are similar to those in the United Kingdom, but, in the former country, margarine may not be sold from the same premises as butter. In France, in order to prevent imitation of the appearance of butter, the use of colouring matter in margarine is prohibited and the two commodities may not be manufactured in the same establishment. In Germany, Austria and Belgium, all margarine must contain a tell-tale substance—sesame oil—to facilitate its detection in the laboratory.

In New Zealand and Australia, where butter-making interests are powerful, the use of colouring matter is prohibited and the shape in which margarine may be sold retail is prescribed. The inclusion of a tell-tale substance is also required.

In Canada, the production, importation and sale of margarine are entirely forbidden. In the United States, the policy followed in the interests of the dairy industry has been to discourage the trade in margarine by means of taxation. In Norway, the interests of the butter industry are met by a quota system under which it is compulsory for all margarine to contain 10 per cent. of butter-fat produced in Norway.

* *Margarine as a Butter Substitute*, by Katherine Snodgrass. Food Research Institute, Stanford University, California, U.S.A.

(iv) Preservatives and Colouring Matter.

The use of preservatives and colouring matter in foodstuffs in general is controlled by the Public Health (Preservatives, etc., in Food) Regulations, 1925 and 1927, which, as regards butter, have been operative since January 1st, 1928. With certain scheduled exceptions, these regulations prohibit the sale and importation of any article of food which contains any added preservatives, and certain toxic colouring matters are prohibited. Boric acid, which was previously the preservative chiefly used in butter, is not now permitted. The use of common salt, however, is permitted and the Regulations do not preclude the use of vegetable colouring matter, annatto, which is commonly used in butter.

(v) The Marking of Imported Butter.*

By an Order-in-Council† dated 17th March, 1932, made under the Merchandise Marks Act, 1926, it is illegal after June 17, 1932, to sell or expose for sale, either wholesale or retail, in the United Kingdom any imported butter or any blend or mixture of butter consisting of or containing imported butter unless it bears an indelible and conspicuous indication of origin.

In the case of pre-packed butter, this indication must be printed or stamped on the outside of each package or on a label securely attached to the outside of each package or visible through the wrapper, in plain block letters not less than $\frac{1}{12}$-in. in height. In the case of butter in bulk for wholesale trade, it must be printed, stamped, branded or stencilled on each outer container, or on a label securely attached to it, in letters not less than $\frac{1}{2}$-in. in height.

Bulk butter exposed for retail sale must bear a show ticket, clearly visible to intending purchasers, bearing the indication of origin in letters not less than $\frac{1}{2}$-in. in height. It is not necessary for a separate indication of origin to be applied to butter taken in the presence of the purchaser from butter in bulk which is already marked in accordance with the Order.

In the case of blends, a number of alternative marks are open to the seller. The mark may be a definite indication of all the countries of origin of the butters in the blend, or it may consist of the words "Including imported butter." In the case of a blend of foreign and United Kingdom butter, the words "Partly foreign" may be used. Where the blend contains both Empire and foreign butter, whether or not it also contains United Kingdom butter, the mark may be "Partly Empire and partly foreign." In the case of blends of Empire butter solely (whether or not United Kingdom butter is included) the word "Empire," and in those consisting of foreign butter solely the word "Foreign" may be used.

* See also Chapter V.

† The Merchandise Marks (Imported Goods) No. 1 Order, 1932.

PART IV.—TRANSPORT AND STORAGE.

CHAPTER XIII.—TRANSPORT.

(i) Sea.

(a) **Facilities.**—The vessels used for carrying butter are of the fast cargo and passenger-carrying types.

It is important that butter should be reduced to a low temperature before shipment, that a low and uniform temperature should be maintained throughout the voyage, that the holds should be clean, that the boxes should be battened so as to enable air to be circulated, and that the atmosphere should be free from odours that might taint the butter.

For the transport of butter from the Southern Hemisphere, steamers with cold-storage accommodation are used ; refrigeration is, in fact, essential, as the voyage lasts up to 40 days. The product can be carried in the frozen state without damage to flavour or texture. For transport from European countries, refrigeration is not used ; Danish and Swedish butter is usually carried in vessels with insulated holds, but this type of vessel is not generally used for butter from the Baltic or Irish ports.

(b) **Rates.**—The following are specimen freight rates per ton for butter between various overseas ports and London :—

To London from :—	In Cold Store.	In Insulated Holds.	In Uninsulated Holds.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Wellington (New Zealand)	6 16 0	—	—
Esbjerg (Denmark) (via Parkestone)	—	1 19 6	—
Copenhagen (Denmark) ...	—	1 14 3	—
Reval (Estonia)	—	2 15 0	2 5 0
Memel (Lithuania) ...	—	2 15 0	2 5 0
Riga (Lativa)	—	2 15 0	2 5 0
Danzig	—	2 15 0	2 5 0
Gothenburg (Sweden) ...	—	1 15 0	—

Landing and handling charges, port dues and insurance are additional.

(c) **Ports of Entry.**—The imports of butter into the principal ports in Great Britain are shown in Table III, page 147. As supplies are obtained mainly from New Zealand, Australia and north-European countries, east-coast ports handle much more of this traffic than those on the west. Roughly, 45 per cent. of the total imports are landed at London ; no other port, with the exception of Grimsby, receives more than 10 per cent.

London handles most of the New Zealand, Australian, Russian and Dutch shipments. Danish is the chief butter received at Grimsby, Newcastle, Leith, Harwich and Goole ; Finnish supplies predominate at Hull (Fig. 43), and the Southampton traffic is largely in Argentine butter. All west-coast ports taken together receive only 10 per cent. of the total imports ; they receive most of the Irish butter, which is consigned principally to Fishguard and, to a less extent, to Liverpool, Glasgow and Holyhead.

(ii) Rail.

(a) **General.**—For the carriage of imported butter from the ports to inland towns, goods-train services are generally used. In the North, the bulk of the imported supplies are loaded direct from the ship to goods trains in the transit sheds adjoining the quay-side. In London, on the other hand, where most of the Southern Hemisphere butter is unloaded, supplies mainly pass into cold-storage at port warehouses to be drawn out as required. No special wagons such as are employed in Sweden and some other countries (see Fig. 44) are used for the conveyance of butter by goods train in this country ; the traffic is normally carried in covered vans.

There is little movement of home-produced butter by goods train. Farm butter, creamery butter and blended butter are, for the most part, sent by passenger train, classed as "fresh" butter. Individual consignments are generally small. The frequent distributive service which the manufacturer aims to give to the retailer requires the prompt delivery afforded by passenger-train services.

(b) **Rates.**—There is no single scale of rates for the carriage of butter by goods train ; the rates vary according to the type of package used. The classification of butter adopted by the railway companies is as follows :—

	Class.
Casks or Cases	14
Half-casks with wooden lids, covered with paper	14
Pails with lids	15
Hampers	15
Unlidded casks, hampers or tubs	19
Crocks	20

Most of the imported supplies fall into Class 14. Though a proportion of the traffic in Classes 14 and 15 passing to smaller places goes at the standard rates at Company's risk, most of the traffic in these classes sent to large towns is at exceptional rates at Company's risk. Collection and delivery services are performed at stations where the companies have the necessary staff and equipment, an addition being then made to the station-to-station rates for cartage services. Handling at terminal points is usually done by the railway company.

The following are examples of charges for butter, at Company's risk, in the various classes between certain points :—

Class.	Rate per ton. (Collected and Delivered).	
	London to Birmingham* (110 miles).	Hull to Sheffield† (51 miles).
	s. d.	*s. d.*
14	38 0 (any quantity) 35 10 (2-ton lots) 32 6 (5-ton lots)	27 5 (any quantity) 26 4 (4-ton lots)
15	38 0 (any quantity) 32 6 (5-ton lots)	29 0 (any quantity) 26 4 (4-ton lots)
19	67 6 (any quantity)	42 3 (any quantity)
20	77 4 (any quantity)	47 11 (any quantity)

* Exceptional rates for Classes 14 and 15, Standard rates for Classes 19 and 20. † Standard Rates.

The rates for conveyance of butter by **passenger train** depend chiefly on whether it is carried at Company's or at owner's risk and on the size of the consignment. When conveyed at Company's risk, the standard scales of rates for general parcels* apply ; when conveyed at owner's risk, exceptional rates are in operation. Specimen rates for consignments of various weights for a distance of 76–100 miles are given below :—

Specimen Rates for Conveyance of Butter by Passenger Train (76–100 miles.)

Weight not exceeding.	Standard Scale, Company's Risk. (C. and D.)	Exceptional Scale, Owner's Risk. (D.)
lb.	*s. d.*	*s. d.*
6	1 1	9
12	1 7	1 1
24	2 6	1 5
28	2 10	1 7
56	4 11	2 8
112	9 1	4 8

C. and D.=Including collection and delivery.
D.=Including delivery.

* See Railway Clearing House *Scales of Rates for Conveyance of Parcels Traffic.* Particulars may also be obtained from any railway station.

In addition to the above scales, exceptional "point to point" rates at owner's risk are arranged when there is sufficient regular traffic to justify them. The following are examples of these exceptional rates :—

Exceptional "Point to Point" Rates for Conveyance of Butter by Passenger Train.

Journey.	Rate per cwt.	Conditions.
	s. d.	
Trowbridge to London (97 miles).	3 11 (minimum 56 lb.) 3 6 („ 1 cwt.) 3 2 („ 10 „)	Owner's Risk; Station to Station.
London to Birmingham (110 miles).	4 6 („ 56 lb.) 4 2 („ 1 cwt.)	
London to Sheffield (158 miles)	5 6 („ 56 lb.)	

(iii) Road.

Although the railways are the main transport agency for butter, road transport is used to a considerable extent to clear butter from the ports to inland consuming areas, particularly in the North. European butter arriving at east-coast ports may be conveyed by road as far as Manchester and Birmingham, but road transport is more commonly used for shorter distances. In view of the general practice of selling out each week's supply of Continental butters, buyers replace their stocks with sufficient regularity to justify the arrangement of regular weekly collections from the ports. The use of road transport has the advantage that the butter is delivered direct to the buyers' premises. The work is usually done by road transport contractors and not by merchants' vehicles. In re-distribution, however, butter is carried in wholesalers' vehicles along with other produce.

Home-produced butter is brought to market by farmers or carriers in horse-drawn or motor vehicles along with other produce such as eggs, poultry, etc. and is similarly taken away by road by the buyer.

CHAPTER XIV.—STORAGE.

(i) General.

The main requirements in the storage of butter are a suitable temperature and freedom from odours. Butter kept at too high a temperature deteriorates in texture, flavour and composition. At temperatures over 65°F., the fat becomes soft and oily, with the result that the butter not only suffers in appearance but becomes

increasingly difficult to handle. The most serious effect of high temperature, however, is that it encourages the development of rancidity through bacterial action. While the effect of high temperature is to spoil the flavour of butter in any case, rancidity tends to develop more rapidly in badly made butter—e.g. butter containing casein as a result of imperfect washing or containing lactic acid through the cream having been over-ripened.

At one time, the commonest method of preserving butter was to add salt or some other chemical preservative. Many consumers, however, object to a strongly salted butter and some prefer butter entirely unsalted. The addition of other preservatives to butter is now prohibited (see page 88). The problem of large-scale butter storage has been solved by the development of mechanical refrigeration, which is extensively used throughout the world for butter in transit and awaiting shipment or sale. Without refrigeration, it would, in fact, be impossible for countries in the Southern Hemisphere to market their product in this country at all.

Apart from the actual temperature maintained, it is important that the temperature should be uniform throughout ; the conditions of storage should therefore provide for the free circulation of air round the packages. Boxes of butter, on account of their shape, are more liable than casks to suffer from close stacking ; special attention to the spacing of boxes is therefore necessary. This does not apply so much to the pyramid box as to the square or rectangular box. As butter easily absorbs foreign odours, it should not be kept in surroundings liable to contaminate it or close to strong-smelling substances.

(ii) Cold Storage Facilities.

Scandinavian butter, arriving at east-coast ports, mostly passes direct on to rail without going into store. In London, however, where 95 per cent. of the supplies from the Southern Hemisphere arrive, much of the butter passes into public cold-stores at the docks or riverside. In the case of New Zealand butter, which is all received at Hays Wharf, there is a rule that unless the butter is cleared from the wharf within 24 hours of unloading, it must be placed in cold-storage. This rule was made, on the advice of the New Zealand Dairy Produce Board, in order to avoid loss of quality as a result of adverse conditions while the butter is awaiting sale. There are no similar requirements in the case of Australian and Argentine butter : butter of these kinds may remain in unrefrigerated warehouses until sold.

Butter intended for storage up river is discharged from the vessels' holds at the docks direct into barges and is lightered up the river ; about 30,000 boxes are brought up in one tow of six barges. The butter is unloaded by crane from the barges direct into the warehouses, where it is sorted according to grades and marks. Supplies not dispatched to merchants' warehouses or to

buyers then pass into cold-store awaiting withdrawal to order. The temperature maintained in the cold-storage rooms is between 16° and 18° F.

The following is an example of storage charges in respect of New Zealand butter, extracted from the rates schedule of The Proprietors of Hays Wharf, Ltd. :—

	Per ton net. s. d.
Lighterage (when incurred), landing, sorting to marks and grades, removal to cold-stores after landing and sorting (if delivery orders have not been lodged), rent for one week from and including the first day of landing, and delivery to land conveyance	16 6
Rent :—After the first 7 days	6 0
Thereafter for each 7 days or part thereof ... ... (Minimum charge on any parcel to be 3*s.*)	5 0
Port rates (payable to the Port of London Authority) (less 5 per cent. discount)	2 6

In addition to the public cold-stores at the docks and riverside, some of the larger wholesalers and blenders have their own cold-stores for butter storage. Wholesalers and multiple stores in the large inland consuming centres also make use of public cold-storage accommodation for short periods. The purchaser arranges for the removal of butter from public cold-stores, the terms of sale by the importer and merchant being "ex warehouse."

Merchants' unrefrigerated warehouses at the ports are little used for storage, the only butter kept there being samples and small quantities for casual local sales.

So far as home-produced butter is concerned, public cold-stores in towns in or near the butter-making districts of the south-western counties and south-west Wales are used to some extent by blenders for the storage of summer-produced butter which is withdrawn in winter and blended with freshly made supplies.

(iii) Preservation on the Farm.

At the height of the producing season, many farm butter-makers preserve a proportion of their output for use in winter when supplies are short. The method of preservation consists of salting somewhat heavily—at the rate of roughly 1 lb. of salt to every 20 lb. of butter—and placing in glazed earthenware or stone vessels, or sometimes enamelled pails, in lots of from 20 to 40 lb. This practice, which is adopted to some extent in all the main butter-making districts, is known as preserving, pickling, potting or tubbing. It is usually done in the months of August and September, though small quantities are also preserved earlier in the year. "Aftermath" butter gives better results than summer butter, a fact which is commonly attributed to the nature of the herbage in the late summer; another explanation is the lower temperatures ruling during the later part of the season. The period of storage is sometimes as long as six months and

naturally, as time goes on, the quality of the butter often becomes very poor.

The preservation of butter on the farm is mainly for the purpose of supplying the household needs of the producer in the winter, but it is also sometimes done for neighbours and friends. Occasionally, butter is preserved for local merchants or dealers, but very little farm-preserved butter enters into trade. It is, in fact, generally too inferior in quality for sale to the public.

PART V.

CHAPTER XV.—CONCLUDING OBSERVATIONS.

Although the butter industry in this country is the largest outlet for milk outside the liquid milk market, less than 14 per cent. (about 178 million gallons in all) of the total annual milk output of Great Britain is used for butter-making. The increasing demands of the fluid milk market and the development of improved facilities for transport and distribution have made the sale of milk for liquid consumption the main concern of the dairy farmer. Not only have more and more farmers been drawn into milk production for this purpose, but farms where previously either butter or cheese was made have been diverted to milk selling until the production of these two commodities on any considerable scale is limited to certain areas and scattered farms which are not favourably situated for the supply of the milk market. Farm butter-making is now mainly concentrated in remote and hilly districts. Elsewhere, it is carried on chiefly for the supply of the farm households. Moreover, in the butter-making districts, butter is not the main concern of the farms engaged in its production ; it is more or less incidental to a stock-rearing system of farming. Nor has butter-making been taken up to any great extent by large-scale milk distributors as a means of disposing of milk surplus to the requirements of their trade.

Similarly, in relation to the total butter consumption of the country, home supplies are relatively unimportant. The increasing demand of the population for dairy produce has been met more and more by imports from other countries, especially Denmark, New Zealand, Australia and the Irish Free State, where the dairy industry has developed rapidly. During the past 40 years, the annual butter imports have increased from 2 million to an average of about 6½ million cwt. and in 1931 even exceeded 8 million cwt., and cheese imports during the past 50 years have grown proportionately. In recent years, nine-tenths of the total consumption of butter has consisted of imports. In fact, in the main centres of population, home-produced butter, excluding from that term imported butter blended in factories in this country, is almost unknown. The output of some of the butter-making areas of this country is insufficient to meet even local needs and, in other areas, any exportable surplus that there may be is small.

But there is a limit to the quantity of milk that can be disposed of in liquid form at a remunerative price. How to secure the diversion of " surplus " milk into manufacturing outlets and to

prevent its being offered for sale in a saturated fluid milk market is, therefore, one of the main problems of milk marketing organization. At present, cheese-making, which utilizes more of the constituents of the raw material than butter-making, is the method generally used by the distributive trade for converting "surplus." Any marked depression of milk prices due to increased pressure of supplies would also result, no doubt, in an increase of cheese-making on farms. Nevertheless, the demand for butter that is met by imported supplies has represented a milk equivalent, during the past 3 years, of over 1,800 million gallons per annum, and any expansion of the home-butter industry to meet some part of this demand would obviously have an important bearing on the main marketing problem of the milk industry.

The possibility of such expansion largely depends, of course, on the possibility of producing butter in this country at a price that will enable it to compete with the imported product, making allowance for any preference that there may be for the home product because of its relative freshness and because it is a home product. When milk marketing has been efficiently organized this possibility may seem less remote than it does to-day. Meanwhile, it is desirable to examine the marketing technique of the home butter industry in order to see what improvements can be made and to prepare the way for developments that may come.

The first point to consider is the suitability of the home product to market requirements and the extent to which it is adapted to fit into the complex distributive system—involving the regular movement of supplies in large bulks—which ministers to the needs of the large masses of population. The importance of supplying the consumer with an article that does not vary in quality and character from time to time is pointed out in this Report (Chapter IV); uniformity is probably even more essential in this respect than superlative quality. Moreover, a standardized article obviously lends itself better to the large-scale buying operations of the big multiple-shop firms of retailers who now operate so extensively in the provision trade in urban centres and of the wholesale merchants through whom the small town retailer obtains his supplies.

The Report draws attention (Chapter IV) to the extreme lack of standardization in farm butter to-day. Although the best farm butter is superior to the creamery product, much of the butter produced on farms is of inferior quality. The position of butter-making in the farming system, no doubt, largely accounts for this state of affairs. Moreover, even with the best intentions and skill, the number of small makers is so great and the conditions under which both milk and butter are produced on farms so diverse, that there are bound to be wide differences in the character of the product from farm to farm.

The possibilities of raising the general level of quality of farm butter by means of a National Mark scheme, as has been done for other agricultural products, are discussed in Chapter VI. Although a minimum standard of quality and composition could, no doubt, be defined as a basis for the application of the National Mark, wide differences in character between the output of different farms would remain and, on that account, a National Mark scheme for farm butter is not recommended. It would have little commercial value.

Looking at the problem from the marketing aspect alone, the development of the butter industry in this country, on a scale to supply any material proportion of the requirements of the large urban markets, appears to depend on centralization of manufacture in creameries or blending factories in areas suitable for making the best use of the by-products. The advantage of centralized manufacture in securing uniformity of product and the relative advantages of the various types of centralized manufacture —viz., creamery systems based on milk delivery or cream-gathering respectively, and the blending of purchased butter in factories— are discussed in Chapter IV. On the basis of a creamery-butter industry generally built up on co-operative lines, exporting countries have been able to create a reputation for their produce by adopting systems of grading and quality control which are in most cases compulsory. Some of these systems are described in Chapter V. The result is to be seen in the high and uniform quality of most of the supplies of butter coming into this country from overseas.

The development of creameries in suitable areas in this country may follow from the rationalization of milk marketing, and it is certain that the growth of a creamery-butter industry on any considerable scale would require the adoption of quality-control measures similar to those in operation elsewhere. There seems, therefore, to be no reason why a start should not be made now in the establishment of a voluntary system of quality control for such supplies of home-manufactured creamery butter as are available. A suggested scheme for the application of the National Mark to creamery butter produced in England and Wales is accordingly outlined in Chapter VI. This would operate somewhat on the lines of the control systems in European countries. The use of the Mark would be granted to creameries that were adequately equipped and staffed to turn out a product of the required quality. A constant check would be kept on the quality of Mark butter by the official examination of samples taken at random. The discovery of a sample that was not up to standard would lead to a closer watch being kept on the output of the creamery concerned and, if necessary, the right to apply the Mark would be withdrawn until evidence was given of a return to the required standard.

The application of the National Mark to factory butter would largely depend on the possibility of ensuring that the Mark was not

applied to blends containing imported butter. When experience has been gained of the working of the Butter Marking Order (see Chapter XII), it may be found practicable for factory butter to be included in a National Mark scheme.

The home output of creamery butter is at present small ; but the adoption of a voluntary system of quality control would guide the industry along right lines and provide a basis for future developments.

SECTION II.

CREAM.

PART I.—A PRELIMINARY SURVEY.

CHAPTER I.—SUPPLIES.

There are three principal kinds of cream on the United Kingdom market. The bulk of the home supplies and of the imports from the Irish Free State consists of fresh cream, mostly containing about 50 per cent. of butter-fat; a large proportion of the cream produced in Devon and Cornwall is clotted cream containing about 60 per cent. of butter-fat; while the bulk of the imports from the Continent and a small proportion of those from Ireland are tinned cream usually containing between 20 and 25 per cent. of butter-fat.

Small quantities of home-produced fresh cream of a "light" type, containing from 20 to 25 per cent. of butter-fat, are also sold, particularly in the Midlands and the North. Cream intended for butter-making usually contains between 30 and 35 per cent. of fat.

(i) Home Production.

(a) **Quantities.**—Cream for sale is produced by farmers, by country creameries or milk depots and by urban milk distributors. Complete statistics of the home production of cream for sale are not available, but some indication of its extent may be obtained from the following Table, based on the industrial* and agricultural† censuses of production relating to the years 1924 and 1925, respectively :—

Estimated Annual Production of Cream in Great Britain by various Agencies.

Where Produced.	England and Wales.		Scotland.		Great Britain.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Gallons.	£	Gallons.	£	Gallons.	£
Farms ...	650,000	320,000	206,000	100,000	856,000	420,000
Creameries	1,421,000	1,109,000	428,000	305,000	1,849,000	1,414,000
Large-scale Urban Milk Distributors	362,000	156,000	69,000	39,000	431,000	195,000
Total ...	2,433,000	1,585,000	703,000	444,000	3,136,000	2,029,000

* Final Report on the Third Census of Production of the United Kingdom, 1924.

† The Agricultural Output of England and Wales, 1925 (Cmd. 2815/1927) and the Agricultural Output of Scotland, 1925 (Cmd. 3191/1928).

This cream is not all available for consumption as such, since a proportion of the cream produced on farms is sold to creameries for butter-making. On the other hand, the figures do not include cream separated by the numerous small urban retail dairymen, statistics of this supply not being available.

The annual output of cream in Great Britain in the period 1924–5 represented a liquid milk equivalent of over 41 million gallons.* This is only about one-thirtieth of the estimated total output of milk in Great Britain in 1925. In all probability, however, the trend of cream production has been upwards since pre-War days. The annual output of over 3 million gallons in 1924–5 shown by the above Table compares with about 2 million gallons from similar sources in 1907–8.

(b) **Location.**—Owing to the simplicity of the separation process, cream can be produced wherever sufficient supplies of milk are available. There are, however, certain areas where cream production on farms is relatively concentrated. In some of these areas, this is accounted for by the system of farming, though proximity to a good market for cream may also be a factor. Where stock raising, for example, is the main object of the farming system, separated milk is fed to the young stock and the cream is, in effect, a by-product which may be either sold as cream or converted into butter on the farm.

Excluding those parts where cream is mainly produced for butter-making, the principal cream-selling areas are a *south-western area*, comprising the counties of Devon, Cornwall, Somerset and Dorset, and a *northern area*, embracing Westmorland, the West Riding of Yorkshire, Lancashire and Cumberland. Two other areas of some importance are the *south-eastern counties* of Kent, Sussex, Surrey and Hampshire, and the *midland counties* of Derby, Salop, Warwick and Worcester. The cream trade of south-west and south-east England is associated with the large number of coastal holiday resorts in those areas.

Some idea of the relative importance of the different cream-producing areas is given by the figures in the following Table :—

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* The conversion figures used are, for farm-produced cream, 1 gallon of cream from 12·3 gallons of milk, ; for other cream, 1 gallon from 13·6 gallons. The conversion ratio varies with the richness of the milk and the type of cream produced. In general, a larger yield is obtained in the case of the farm than the creamery product.

Approximate Sales of Cream off Farms in Certain Groups of Counties in 1925.*

Area.	County.	Quantity.	
		Gallons.	
South-Western	Devon	183,745	338,093
	Cornwall	118,413	
	Somerset	24,892	
	Dorset	11,043	
Northern	Westmorland	50,579	108,637
	West Riding	24,677	
	Lancaster	17,457	
	Cumberland	15,924	
South-Eastern ...	Kent	18,044	46,357
	East Sussex	11,182	
	Surrey	8,686	
	Hampshire	8,445	
Midland	Worcester	16,052	44,045
	Salop	10,644	
	Derby	8,883	
	Warwick	8,466	

* These figures include cream sold to creameries for butter-making.

Although cream production *on farms* is greatest in the south-west, where just over 2 per cent. of the milk output is used for this purpose, production is relatively most intensive in Westmorland. Thus, farmers in Westmorland sell 22 quarts of cream for every 1,000 gallons of milk produced, compared with 17 in Devon and Cornwall. The farmers of Devon and Cornwall, however, sell nearly one-half of the total volume of cream sold by farmers in England and Wales, whilst Westmorland accounts for only 8 per cent.

About 60 per cent. of the total cream output, excluding that of small urban milk retailers, is produced by country creameries. While no figures are available to indicate the creamery production of cream in different districts, the creameries themselves are chiefly concentrated in Somerset and Dorset, followed by a second group in the counties of Chester, Derby, Stafford and Salop. Elsewhere, creameries engaged in cream production tend to be scattered. The counties of Somerset and Dorset are probably by far the most important suppliers of the creamery product.

In addition to the production of cream in country districts, a considerable volume (14 per cent. of the whole) is produced in towns throughout England and Wales by large urban milk distributors.

(c) **Periodicity.**—The separation of cream for sale is highly seasonal; it is greatest, particularly on farms, during the summer. This is partly due to the seasonal incidence of demand, partly, in the case of farm separation, to the system of farming. The demand for cream is strongest in the soft-fruit season. On the stock-rearing farms, where cream is mainly produced, calvings are generally arranged to take place in the spring and milk for separating is, in consequence, chiefly available during the summer; on some farms, as much as 70 per cent. of the annual milk output may be obtained in the 6 months from May to October inclusive. There is a sharp increase in production at Christmas and a smaller increase at Easter, in both cases in response to a temporary increase in demand.

(ii) Imports.

(a) **Quantities.**—The total imports of cream into the United Kingdom,* together with re-exports (which are practically negligible) and the balance of imports retained for home consumption, are shown, by quantity and value, for each year from 1901–13 and from 1922–30 inclusive, in Table IV, page 148. The general trend of net imports during the present century may be summarized as follows† :—

Year.	*Cwt.*	*Gallons.‡*
1901	6,198	77,000
1913	9,078	113,000
1922	11,046	137,000
1925§	88,129	1,093,000
1929§	137,794	1,709,000
1930§	134,600	1,669,000

Before 1901, imports were not separately distinguished in the trade returns; they were, however, relatively small. During the present century and especially since the War, there has been a remarkable increase. Before the War, imports fluctuated considerably from year to year, but only in 1910 and 1911 did they exceed 10,000 cwt. The rapid development since the War is partly, but by no means entirely, accounted for by the inclusion, since April 1st, 1923, of consignments from the Irish Free State.

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* Imports into the United Kingdom are almost entirely into Great Britain. From 10,000 to 15,000 cwt. per annum are, however, imported into Northern Ireland from the Irish Free State.

† Since April 1st, 1923, the figures relate to Great Britain and Northern Ireland.

‡ Imports of cream are recorded by weight, not volume. The conversion figure used to arrive at the volume is 9·85 lb. per gallon.

§ Imports from countries other than the Irish Free State in these years were as follows :—

Year.	*Cwt.*	*Gallons.*
1925	23,282	289,000
1929	62,018	769,000
1930	68,837	854,000

During the years 1922 to 1930, inclusive, imports from countries other than the Irish Free State increased more than 6 times.

Both fresh and tinned cream are imported. No distinction is made between the two products in the trade returns, but practically all the fresh cream comes from the Irish Free State. That country also supplies a certain quantity of tinned cream. Although there are no exact data, it may be estimated from Table V that during the past few years tinned cream imports have become increasingly important and in 1930 probably made up almost half the total. The extraordinary increase in cream imports from the Continent since the War has, in fact, been mainly due to the growth of the tinned cream industry in Continental countries.

(b) **Sources.**—The principal countries from which cream was imported in the years 1901–13 and 1922–30 are shown in Table V, pages 149–150. Up to 1913, France was the largest supplier, followed by Norway. Imports from the Netherlands and Denmark, which in the early years of the present century were of some importance, rapidly declined, and from 1905 to the outbreak of the War were practically negligible. Since the War, the relative importance of the sources of supply has been reversed. Supplies from France have ceased altogether and those from Norway have declined. On the other hand, imports from Denmark and the Netherlands have very greatly increased. Denmark is now the most important foreign supplier, having sent, in 1930, 47,000 cwt., or roughly two-thirds of the foreign imports. Imports from the Netherlands in 1930 amounted to 13,500 cwt., or almost 20 per cent. of foreign imports. A relatively new source of supply is Switzerland. Since 1927, imports from that country have increased by about 50 per cent. and in 1930 amounted to 6,850 cwt., or 10 per cent. of all imports from foreign countries.

Particulars are not available of the imports of cream from the Irish Free State in pre-War years. Since the War, however, the Irish Free State, which is the only Empire country from which any considerable quantity of cream is obtained, has contributed more than half of the total imports and, as has been stated, practically the whole of the imports of fresh cream.*

After 1923, imports from the Irish Free State showed a steady increase up to 1927, but since that year have somewhat declined. The commencement of this decline coincided with the prohibition, in 1928, of the use of preservatives in cream in the United Kingdom (see page 122). On the other hand, imports from foreign sources, in particular from both Denmark and the Netherlands, almost doubled in 1928 as compared with 1927, and have remained at a relatively high level since. The cream from these sources is tinned and, having been sterilized, will keep without preservatives.

* From 15 to 20 per cent. of the imports from the Irish Free State consist of consignments across the land boundary into Northern Ireland.

The prohibition of preservatives thus appears to have been of assistance to the tinned-cream trade.

(c) **Periodicity.**—Table VI, page 151, which gives the monthly imports of cream into the United Kingdom* during the years 1928–30, shows that fluctuations in imports from month to month are comparatively wide. There is also considerable irregularity in the monthly incidence of imports from one year to another. For example, in 1928, 10 per cent. of the year's imports arrived in March, and only 5 per cent. in December ; in 1929, only 5 per cent. arrived in March, and 11 per cent. in December. In general, however, imports of cream are at their lowest between November and March, after which a gradual increase takes place to a maximum in the period June to August—the soft fruit season—the peak usually occurring in July. In the period under review, approximately 34 per cent. of the annual imports were received in the 3 months June to August and 33 per cent. in the 5 months November to March.

(d) **Import Duties Act, 1932.**—Cream, like butter, is one of the commodities on which, under the Import Duties Act, 1932, a Customs duty of 10 per cent. *ad valorem* has been imposed as from 1st March, 1932 ; cream from the Dominions, however, is exempt from the *ad valorem* duty and any additional duty until November 15, 1932. The arrangements to come into force after that date in regard to products from the Dominions will be the subject of discussion at the Ottawa Conference in July, 1932.

(iii) Total.

(a) **Quantity and Value.**—As indicated on page 104, the annual output of cream in Great Britain, excluding cream consumed in farm households and cream produced by small urban retailers, exceeded 3 million gallons in 1924–5, compared with about 2 million gallons in 1907–8. Imports have shown a still greater expansion —from an average of 140,000 gallons per annum in the period 1905–9, to nearly 1 million gallons in the post-War period 1924–7.† The total supply available for sale in Great Britain in 1924–5, excluding production by small retailers, was, therefore, in round figures, about 4 million gallons, of a value estimated at roughly £2½ million, of which the value of home-produced supplies was about £2 million. Imported supplies increased from less than 10 per cent. of the total volume before the War to about 25 per cent. in the post-War period. During more recent years, supplies have probably been considerably greater, since, in the years 1929–30,

* Excluding imports into Northern Ireland through land boundary stations.

† In view of the fact that official import statistics are collected in respect of the United Kingdom, an adjustment, which is not altogether free from uncertainty, has been made in order to arrive at the imports of cream into Great Britain.

imports averaged almost 1,700,000 gallons, while home production has probably little changed.

(b) **Per Capita Consumption.**—The total supplies of cream available for sale in Great Britain have increased since before the War, not only absolutely but also in relation to the population. In the pre-War period, the estimated supply per head of the population was about ½-pint per annum, compared with about seven-tenths of a pint in the post-War period.* This increase may be related to the remarkable increase in fruit consumption during the present century.

CHAPTER II.—DEMAND.

(i) Fresh Cream.

Cream is mostly bought for its palatability rather than for its food value, although a small volume is used regularly in invalid and infant diet. It is frequently used as a superior substitute for milk in tea and coffee, and with porridge and other breakfast cereals, but the regular purchase of cream for these purposes is mainly confined to the more well-to-do. The use of cream with fruit, particularly fresh, soft fruits, is more general, but spasmodic.

The demand for cream, as for luxury products in general, is elastic. A period of trade depression, for example, tends to be soon reflected in a diminished consumption.

The type of cream most generally used for domestic purposes is a "heavy" cream (containing about 50 per cent. butter-fat), either raw or pasteurized.

A "light," homogenized† cream of about 20 per cent. butter-fat content, pasteurized but not sterilized, and sold in bottles or cartons, has been put on the market in some districts. It seems probable, from the experience thus gained, that a larger and more regular demand for cream could be developed if a product of this type but of a definite standard of fat-content were put on the market generally and offered at a lower price than that of ordinary "heavy" cream.

(ii) Clotted Cream.

In Cornwall and Devon, the cream produced is almost entirely clotted; clotted cream is also produced in Somerset, though to a

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* These figures unavoidably include sales off farms to creameries for butter-making; but, as the creamery production of butter has not altered greatly, the increase is probably almost all due to actual cream consumption.

† Homogenization consists of forcing the cream under pressure through a fine aperture, the fat globules being split up in the process and the product rendered permanently more viscous.

less extent than in Devon and Cornwall, where it is more widely used than is fresh cream elsewhere. Like fresh cream, it is eaten with fruit, breakfast cereals, etc., but it is unsuitable for use in tea and coffee. It is frequently used with jam as a substitute for, or in addition to, butter. The production of clotted cream is considerably increased in summer to meet the needs of visitors, who also commonly have it sent away to friends. A fair quantity of clotted cream is dispatched by post at other seasons, particularly at Christmas. This external demand is chiefly confined to the south of England, whence most of the holiday visitors come.

It is difficult to send clotted cream long distances in good condition, and this militates against the development of the trade. The primitive conditions under which some of it is produced, on farms and small dairymen's premises, do not promote keeping quality and the product soon loses its sweetness if sent any distance, particularly now that the use of preservatives is prohibited. Moreover, its characteristic texture is damaged by shaking in transit, so that, after being sent through the post, clotted cream is a less attractive product than that which can be bought in the district where it is made. Some dairymen, however, in London and other large towns, particularly on the south coast, cater for the demand for clotted cream, supplies being usually obtained in bulk from Cornwall or Devon for re-sale in tins or single-service containers.

(iii) Tinned Cream.

Judging from the growth of imports from Denmark and the Netherlands, there is an increasing demand for tinned cream in spite of the fact that the delicate flavour of cream is impaired by the high temperature involved in sterilization. This increase in demand is due partly to the relative cheapness of the product and partly to its superior keeping qualities. It can, moreover, be sold, without risk of deterioration, by a wide range of retailers.

The demand for tinned cream is at present almost entirely met by imports, and there thus appears to be scope for considerable development of cream canning in this country as a means of utilizing surplus milk.

(iv) Seasonal Variations.

The demand for cream is markedly seasonal. It is at its highest during the months of June to August—the soft fruit season. In particular, the length of the strawberry season and the price of strawberries mainly determine the extent of the demand for cream in the early summer.

Although there is a marked decline in demand after September, the big increase in the consumption of canned and bottled fruits that has taken place in recent years has tended somewhat to even-out the consumption of cream throughout the year.

A temporary increase in demand occurs at Christmas time, when the quantity consumed is considerable. More cream is sold on Christmas Eve than on any other day of the year. There is also an increase in demand during the Easter week-end but to a much less degree than at Christmas.

(v) Day-to-Day Variations.

The demand for cream is greatest at week-ends. Figures supplied by a number of typical firms delivering cream to the door show the following distribution of sales throughout the week :—

	Per cent.
Sunday	40·8
Monday	7·0
Tuesday	7·7
Wednesday	8·3
Thursday	8·8
Friday	7·0
Saturday	20·4

The sales of cream from shops show a somewhat similar distribution, though, as dairy shops are normally closed on Sunday, sales for Sunday's use take place on Saturday or, to some extent, on Friday. These two days account, on the average, for roughly 50 per cent. and 20 per cent., respectively, of the week's sales from shops.

Light cream, being cheaper, tends to be bought more regularly than heavy cream.

(vi) Effect of Prohibition of Preservatives.

Before the use of preservatives in cream was prohibited in January, 1928, cream was sold both preserved and unpreserved. Unpreserved cream, though easily obtainable, was less generally sold ; in view of its greater perishability, it was in some cases only supplied to order and sometimes at a higher price. It certainly could not be said that the use of preservatives discouraged the sale of cream, in spite of the fact that their presence had to be declared and of the common aversion to food which has been treated by chemicals. In fact, even at equal prices, most buyers preferred preserved to unpreserved cream owing to its better keeping-quality. It might, therefore, have been anticipated that the prohibition of preservatives, by adversely affecting keeping-quality, would have led to a drop in consumption. There is, however, no indication that this has happened so far as home-produced cream is concerned. The creameries and large-scale milk distributors mainly concerned in the sale of cream possess the necessary equipment and organization for carefully controlling the temperature and condition of the cream right up to the time of delivery to the consumer. They have, therefore, been able very largely to overcome the difficulties and, accordingly, the confidence of the consumer has been almost wholly maintained. It is possible that the prohibition is to some extent responsible for the increased

use of cream substitutes ; this is more fully discussed below. Its apparent effect on the importation of fresh cream—where the transport distances involved are greater—has already been referred to (page 107).

(vii) Secondary Uses.

(a) **Confectionery.**—Cream mixed with sugar and whipped is commonly used by confectioners as a filling for pastries. For this purpose, the cream should be of good keeping-quality and sufficiently viscous to " stand up " after whipping. The demand for pastries being variable, it is extremely difficult for confectioners to adjust their supplies closely to the needs of their trade. The difficulty is increased when the pastries are filled with so perishable a commodity as cream. The use of preservatives was of some advantage in this connexion ; if not sold out on the day of filling, pastries could be offered for sale the next day. The prohibition of preservatives, however, has made it necessary for the confectioner who uses cream to be careful to make only as much pastry as he can sell each day, for unpreserved cream when exposed for sale as a filling for pastry deteriorates very rapidly. From the consumer's standpoint this is all to the good, since pastry containing genuine cream must, in the nature of things, be fresh. The effect has, however, been to hasten the adoption, by the confectionery trade, of cream substitutes (see below) which are cheaper and keep longer though less palatable than genuine cream, the demand for which for confectionery purposes has thus fallen off.

(b) **Ice Cream.**—Nowadays, cream is not necessarily an ingredient of ice-cream, though it was, in fact, formerly the main constituent. With the commercialization of ice-cream manufacture, various mixes have been introduced in order to cheapen the product ; these, when whipped and frozen, bear sufficient resemblance to genuine ice-cream to pass under that name. In many countries, therefore, including the United Kingdom, the ice-cream generally sold has come to be a product with a base of milk but, for the rest, consisting mainly of cornflour, sugar and gelatine, together with synthetic flavouring substances. In America, on the other hand, where ice-cream is consumed much more heavily than in this country, the commodity is required by law to contain a minimum of 12 per cent. of butter-fat. This legislation was passed at the instance of dairy firms making ice-cream on a commercial scale. At one time, the demand for a better-quality product was little fostered by manufacturers in this country. Since the War, however, though no legal standards have been prescribed, there has been a steady increase in the popularity of ice-cream made chiefly from milk constituents. Even then, this does not necessarily involve the use of natural cream, as it is possible, with the aid of an emulsifier, to use butter and dried or condensed skimmed milk instead. Manufacturers find, however,

that natural cream gives the greatest smoothness and palatability. The use of cream in ice-cream manufacture is accordingly increasing as consumers become more appreciative of quality. There has been a demand for the establishment of a minimum butter-fat standard for ice-cream in this country. Such a measure, however, would not necessarily increase the use of cream in ice-cream manufacture.

(viii) Cream Substitutes.

A number of substitutes for cream are in common use. These resemble genuine cream in appearance and are of two main kinds —(*i*) artificial or reconstituted creams made entirely from milk constituents and (*ii*) products containing fats other than milk-fat.

The principal ingredients from which cream substitutes are prepared are water, skimmed-milk powder, condensed skimmed milk and either butter or some form of vegetable fat. These ingredients are emulsified by means of emulsifying machines. If well made, cream substitutes are not easily distinguishable from genuine cream. Those that contain fats other than milk-fat can be distinguished by chemical analysis, but no means are known of determining, with certainty in all cases, the difference between natural cream and substitutes made entirely from milk constituents.

Cream substitutes are used for the most part as fillings for cakes, buns and pastries. They are seldom used for domestic consumption, but hotels, restaurants, boarding-houses, liners and other large-scale consumers often use them in preference to natural cream because of their cheapness and better keeping-quality.

Cream substitutes began to be recognized as commercial commodities about the year 1924. It is, therefore, only in recent years that they have come to be widely used, and it is commonly believed that their extended use is the result of the prohibition of preservatives. Certainly the two have coincided, but it is difficult to believe that cream substitutes would be much less used than they are to-day if preservatives were still permitted. Although substitutes keep somewhat longer than fresh, unpreserved cream, their popularity is mainly due to their cheapness. This view is supported by the fact that when cream substitutes were first introduced they generally contained butter-fat; gradually, however, this has been displaced by cheaper fats until the bulk of the cream substitutes now manufactured contain fats not derived from milk.

CHAPTER III.—PRICES.

(i) Wholesale.

There are no officially recorded prices published in this country for cream. The only available sources of information regarding wholesale prices are the private circulars forwarded by creameries

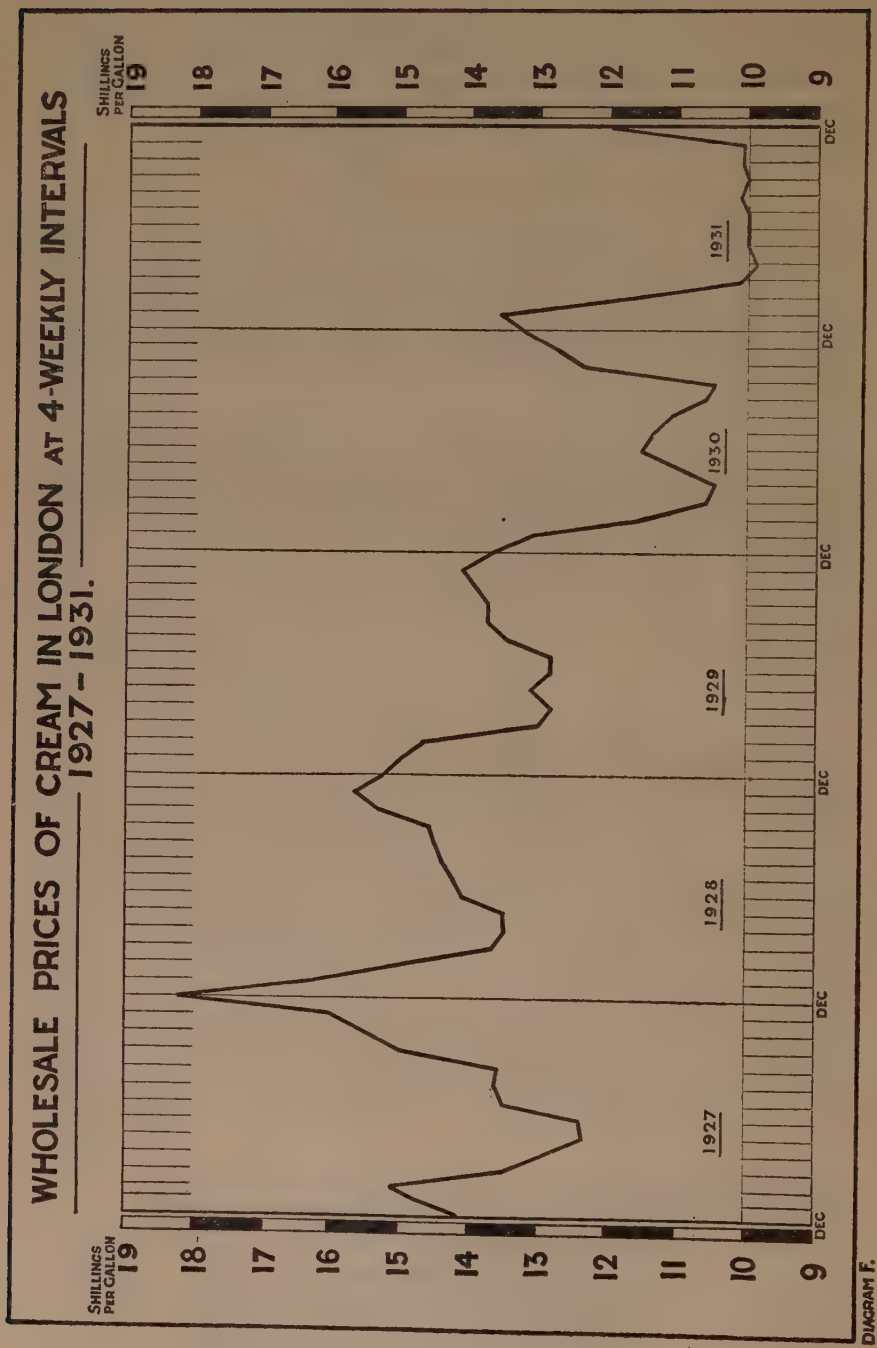
WHOLESALE PRICES OF CREAM IN LONDON AT 4-WEEKLY INTERVALS
1927 - 1931.
SHILLINGS PER GALLON
19
18
17
16
15
14
13
12
11
10
9
DEC
1927
1928
1929
1930
1931

DIAGRAM F.

and wholesalers to their customers. These are usually sent out whenever the price is changed or, in some cases, regularly once a week.

The wholesale prices of cream quoted by a representative firm of wholesalers in London every 4 weeks during the years 1927–31 are shown in Diagram F. Making allowance for seasonal variations, which are very wide, prices of home-produced cream have fallen considerably since the end of 1927, the price in December, 1927, having been 18*s.* 3*d.* per gallon compared with 13*s.* 3*d.* in December, 1930.

As cream is so perishable, short-period variations in prices are determined mainly by conditions of internal supply and demand. It is true that home-produced cream is subject to direct competition from Irish imports, but these form a relatively small proportion—about one-quarter—of the total supply. Bulk supplies of cream are mainly produced by country creameries primarily concerned in supplying the liquid milk market. Being usually more profitable than butter or cheese manufacture, the sale of cream is generally the first means adopted of utilizing surplus milk. The quantities of surplus milk in the hands of creameries have, therefore, a strong influence on the price of cream, and the tendency of this is to cause low prices in early summer. Seasonal variations in demand, however, are also of considerable importance. The soft-fruit season stimulates cream consumption at the time when surplus milk is usually abundant and thus tends to keep prices higher than they otherwise would be, especially during the two or three weeks of the strawberry season. Again, the sharp demand about Christmas—when surplus milk is becoming relatively short—causes very high prices at that season; these have, however, been modified in recent years by the increase in the proportion of surplus milk in winter.

Almost all cream sold wholesale is of approximately 50 per cent. butter-fat content. Consequently, prices of cream from different creameries differ only slightly. Wholesale price quotations, however, vary according to the quantity ordered, the highest prices for bulk cream being charged for lots of cream in one gallon non-returnable tins, and the lowest for quantities of 15 gallons and over in returnable cans or churns, the difference being usually in the neighbourhood of 1*s.* per gallon. The wholesale price of pre-packed cream is naturally considerably higher than that of bulk cream.

In general, the prices of Irish cream follow those of home-produced cream but range from 2*s.* to 3*s.* per gallon lower.

(ii) Retail.

The retail price of cream varies from 1½ to 3 times the wholesale price, according to the amount purchased. On whole pints—the largest retail quantity generally purchased at a time—the gross

profit is usually between 50 and 100 per cent. of the wholesale price ; on smaller quantities, the margin is in some cases as high as 200 per cent. even after deducting the cost of the container. The Linlithgow Committee* criticized this margin adversely, but clearly, it must, to some extent, be due to the irregularity of demand combined with the perishability of the commodity and to the smallness of individual purchases.

The retail price of cream sold in cartons varies between traders and from place to place, and comparison is made difficult for the consumer by the multitude of shapes and sizes of containers in use (see Chapter VII). Apart from pints and half-pints, it is not usual for cream to be sold by declared volume. The retailer stocks a range of cartons of undeclared capacity, priced to meet the requirements of all types of consumer, a typical range being 1*s.* 6*d.*, 1*s.* 1*d.*, 10*d.*, 7*d.*, 4½*d.* and 3*d.* The housewife asks for the carton which she thinks holds the amount she requires. Using a different range of sizes and shapes, another retailer may list his prices as follows :—1*s.* 9*d.*, 1*s.* 3*d.*, 11*d.*, 8*d.*, 6*d.* and 4*d.* In these circumstances, it is difficult, if not impossible, for the housewife to compare prices at different shops. Moreover, the quality of the cream may vary between different traders, some cream being less rich in fat though not necessarily perceptibly thinner (see page 120).

The demand for light cream in those districts where a trade has been built up is more regular. There is, however, no wholesale trade in this class of cream. The retailer either separates it for himself or mixes heavy cream and milk in such proportions as will produce a light cream of the required fat-content. The mixture is then homogenized. The price of light cream per unit of fat-content is rather lower than that of the heavy type.

To coincide with seasonal variations in wholesale prices, the retail price level is generally actually higher in winter than in summer. But, owing again to the fact that containers of standard capacity are not used, the retailer is able to conceal the rise in price by merely changing the size of container.

In contrast to raw cream, clotted cream is generally sold by declared quantity. Being semi-solid, it is generally sold by weight ; the usual range of containers consists of ¼-lb., ½-lb., ¾-lb., and 1-lb. sizes. In the postal trade, inclusive prices are charged to cover the cost of the cream, the container, packing and postage ; these vary from 4*d.* to 7*d.* per lb. above the retail price of the cream when sold over the counter ; since the postage on packages up to 1 lb. in weight is only 3*d.*, a margin of from 1*d.* to 4*d.* is thus taken to cover the cost of the tin (½*d.* or 1*d.*), the wrapping and the extra trouble involved. When cream is sold over the counter, no charge is usually made for cartons, but a charge of 1*d.* or 2*d.* is made for

* Cmd. 1852/1923, page 79.

tins. In a few cases, a refund is given if the tin is returned to the shop in sound condition.

Retail prices of clotted cream vary from one district to another, a typical range being from 2*s.* to 2*s.* 8*d.* per lb. for cream not specially packed ; prices at different shops in the same town do not vary greatly : what differences there are can be accounted for mainly by differences in quality.

Tinned cream is sold at a price per tin, but the tin usually bears an indication of the net weight. The retail price works out generally at about half that of fresh cream, or even less. The fat-content of this type of cream, however, is only about half that of fresh cream.

PART II.—QUALITY AND PREPARATION FOR SALE.

CHAPTER IV.—QUALITY CHARACTERISTICS.

(i) Butter-fat Content.

The butter-fat content, or richness, of cream depends upon that of the milk used and the number of gallons of milk separated to produce a given quantity of cream. It thus bears a direct relation to the cost of production. It largely determines the value of cream both for butter-making and domestic consumption. Broadly, the higher the butter-fat content, the higher the price. In practice, the upper limit of butter-fat in fresh cream is in the neighbourhood of 50 per cent., and cream as sold wholesale usually contains about this proportion. Cream containing more than this does not realize a correspondingly higher price. Fresh cream is often diluted in the course of distribution and, as bought by the consumer, may contain any percentage of fat down to 40 per cent. A certain quantity of light cream, containing 25 per cent. or less of fat, is on the market in some districts. One large firm markets two grades of light cream—"Fruit Cream," containing 25 per cent. of fat, and "Coffee Cream," containing 18 per cent. of fat—each grade, as well as heavy cream of 50 per cent. fat-content, being put up in cartons of distinctive colour. Clotted cream normally contains about 60 per cent. of butter-fat.

There is some confusion in the public mind between true richness—i.e., high butter-fat content—and thickness, which is regarded, often erroneously, as an indication of richness. The consumer, in fact, does not generally trouble about the composition of cream but regards its consistency as the main consideration. It is of course true that, other things being equal, the richer the cream the thicker it is, but, as shown below, the converse does not always apply.

(ii) Sweetness.

For domestic uses, confectionery and ice-cream manufacture, sweetness in cream is essential; any trace of sourness makes it unfit for these purposes. Not only must the cream be sweet at the time of sale but it may be required to remain sweet, without refrigeration, for 24 hours or so afterwards.

The maintenance of sweetness is entirely a question of checking bacterial growth. Preservatives may no longer be used, but the following measures are available:—

(i) The production of the milk under such conditions as to prevent, as far as possible, bacterial contamination. This involves the maximum cleanliness in the cowshed and dairy and in the utensils employed.
(ii) The pasteurization of the milk or the cream.
(iii) The retention of the cream at a low temperature during transport and distribution.

Research has been carried out at the National Institute for Research in Dairying* into the relative effects of these three measures on the keeping properties of cream.

Thus, samples of cream separated from Grade A (T.T.) milk of very low bacterial content remained sweet at 60° F. from $2\frac{1}{2}$ to $3\frac{3}{4}$ days, while cream from raw milk remained sweet at the same temperature for only 1 to $1\frac{1}{4}$ days.

Cream from Grade A (T.T.) milk pasteurized at a temperature of 160° F. had a "life" of 5 days compared with 4·26 days for similar cream untreated by heat, while, in the case of cream from ordinary commercial milk, the "life" of the pasteurized product was 2·85 days compared with only 1·3 days for unpasteurized.

The effect of holding cream below 60° F. was to extend further the keeping period. The following Table shows the keeping properties of raw and pasteurized cream, from both Grade A (T.T). and undesignated milk, when retained in an incubator at 60° F., in a cold-store and in an ice chest, respectively :—

Keeping Periods of certain kinds of Cream at different Temperatures.

Kept in	Raw Cream from :—		Pasteurized Cream from :—	
	Grade A (T.T.) Milk.	Undesignated Milk.	Grade A (T.T.) Milk.	Undesignated Milk.
	Days.	Days.	Days.	Days.
60° F. Incubator ...	3·0	1·125	5·0	2·85
Cold Store	9·3	3·30	—	7·5
Ice Chest	17·5	7·75	27·0	15·3

When cream which has been refrigerated for some days is again subjected to ordinary temperatures, its keeping "life" tends, however, to be short.

At least as important as the provision of a low temperature during transit and distribution is the separation and cooling of cream as soon as possible after the milk leaves the cow.

* "The Keeping Quality of Cream without Preservative," by M. Sargeant, D. V. Dearden, and A. T. R. Mattick. *Milk Industry*, June, 1928.

Unquestionably, the most important factor is that the milk should be produced and separated under clean conditions. Pasteurization and refrigeration may make cream marketable which would otherwise be useless as table cream, but high keeping-quality can only be secured if the milk from which it is obtained is itself of good keeping-quality. To some extent, preservatives retarded the development of sourness in cream of high bacterial content, and the prohibition of their use has, therefore, increased the importance of sound raw material.

The perishability of cream gives a competitive advantage to the farm producer who is located close to the consuming area; but for the supply of cream to retailers at a distance, the creamery, with its pasteurization and refrigeration plant, is in a much better position than the farmer to supply a product that will keep.

The effect of clotting cream is to increase its keeping-quality in the same way as by pasteurization; clotting is virtually a prolonged pasteurization.

(iii) Flavour.

The flavour of cream is a natural feature distinct from sweetness. Sourness impairs or destroys flavour and gives rise to numerous off-flavours. Flavour may also be adversely affected by the method of feeding the cows, by storing the cream near odorous substances such as soap or paraffin, or by atmospheric odours.

Pasteurization, to some extent, eliminates off-flavours but the delicacy of the natural flavour may also be somewhat impaired. When pasteurization is carried out at a temperature not exceeding 190° F., cream does not noticeably lose flavour and its market value does not suffer, but, at higher temperatures, there is serious danger of imparting a cooked flavour apart from the possible effect on viscosity (see below). The distinctive flavour of clotted cream is due to prolonged "cooking."

(iv) Viscosity.

The viscosity or, as it is popularly called, the thickness of fresh cream is the criterion by which the consumer, often inaccurately, judges its richness. It has, therefore, a bearing on market value. Viscosity is influenced, in the first instance, by the fat-content, but it is also influenced by a number of other factors, notably age, temperature and treatment. Freshly separated cream, even when cooled to a low temperature, flows more easily than that which has aged. Ageing increases viscosity even before sufficient acidity has developed to coagulate the casein. Low temperatures also increase viscosity; pasteurization reduces it and, if not properly carried out, tends to induce oiliness.

Viscosity can be increased by homogenization, which consists of forcing cream, under pressure, through a fine aperture; the fat globules are split up in the process, forming a more complete

emulsion. Cream so treated is less liable to fat separation and its viscosity is thus increased permanently. Homogenization is commonly adopted for tinned cream which, being sterilized, is usually kept longer than fresh cream ; fresh cream, except that of low fat-content, is not usually homogenized.

The thickness of cream can also be increased by the addition of certain foreign substances such as gelatine, gum or proprietary thickening agents. This, however, is now illegal in this country.

The viscosity of cream of high fat-content may so increase by ageing and low-temperature storage as to become a hindrance to the retailer, who finds it difficult to pour the cream into the vessels in which it is retailed. Warm water or milk is frequently added to reduce the viscosity, but this, of course, reduces the fat-content to the prejudice of the consumer.

CHAPTER V.—STATUTORY REQUIREMENTS.

In this and other countries, the composition of cream as sold to the public is, to a greater or less extent, controlled by law. Legislative control may extend to the butter-fat content of the cream, to the presence of fat other than butter-fat or of preservatives or other foreign substances, or may amount to no more than a definition of the word cream in general terms.

(i) Butter-fat Standards.

The commonest form of legislative control of quality is the prescription of a minimum proportion of butter-fat.

(a) **Abroad.**—Examples of some of the compulsory minimum butter-fat standards in force in other countries are given in the Appendix, page 152. There is considerable variation between the different standards but, in most cases, the minima prescribed are low compared with the proportion of butter-fat ordinarily contained in cream sold in this country (about 50 per cent.).

(b) **At Home.**—In this country, cream is defined for the purpose of the Public Health (Preservatives, etc., in Food) Regulations, 1925 to 1927, as " that portion of milk rich in milk fat which has been separated by skimming or otherwise and is intended for human consumption." The actual butter-fat content of cream is not specifically governed by law. Under the Food and Drugs (Adulteration) Act, 1928, however, it is an offence to sell to the prejudice of the purchaser any article of food which is not of the nature or not of the substance or not of the quality of the article demanded by the purchaser—and, no doubt, most Courts would consider that cream should have a proportion of milk fat substantially higher than ordinary milk.

A Departmental Committee on milk and cream regulations, which reported in 1901,* did not consider that any regulations with regard to the fat-content of cream were necessary. What virtually amounted in practice to a minimum butter-fat standard for preserved cream prevailed in this country from 1912 to 1928 under the Public Health (Milk and Cream) Regulations, 1912 † which were framed primarily to control the use of preservatives in cream (see below). These Regulations differentiated between cream and preserved cream, and laid down that no preservative should be added to cream containing less than 35 per cent., by weight, of butter-fat. This seemed desirable on the ground that thin cream was consumed in greater quantities at a time than thick cream, and it was thought that to allow preservatives in this kind of cream might result in the consumption of large doses of preservative. Moreover, thin cream was generally sold under conditions similar to those obtaining for milk, and preservatives were considered no more necessary for this kind of cream than for milk.‡

In fixing the minimal limit for butter-fat, account was taken of the fact that the bulk of the rich cream sold contained over 40 per cent. of fat ; in order, however, to allow the distributor a margin of safety, a limit of 35 per cent. of fat was ultimately adopted.

As most of the cream then sold contained preservative, this regulation virtually acted as a statutory minimum for the main supply of cream in this country. Since the prohibition of the use of preservatives in 1928 and the consequent revocation of the Public Health (Milk and Cream) Regulations, 1912, no indication of any kind as to the percentage of fat in cream has been given to the purchaser in this country in connexion with any provision of law.

(ii) Extraneous Substances.

(a) **Preservatives.**—Before 1912, there were no statutory requirements in this country specifically relating to the use of preservatives in cream. A Committee appointed in 1899 to consider the question of preservatives in foodstuffs recommended, in their Report§, that the only preservative which it should be lawful to use in cream should be boric acid, or mixtures of boric acid and borax, in amounts which when expressed as boric acid should not exceed 0·25 per cent. by weight. They also recommended that the amount of such preservative contained in the cream when offered for sale should be notified by a label on the vessel. For two reasons, however, no immediate action was taken on this recommendation. In the first place, although it was recognized that the cumulative effect of regularly consuming cream containing preservatives might prove injurious, it was felt

* Cd. 491/1901.
† Under the Public Health (Regulations as to Food) Act, 1907.
‡ Local Government Board Food Report No. 10, 1909.
§ Cd. 833/1901.

that, as it was usually consumed only in small quantities and at irregular intervals, there was not the same danger to the consumer in permitting the use of preservatives as was the case, for example, with milk. Secondly, it was contended that, owing to the often inevitable delay that occurred between the production of the milk and the consumption of the cream, the cream trade could not be carried on satisfactorily without the use of preservatives. While preservatives continued to be used, successful prosecutions were frequently instituted under the Sale of Food and Drugs Acts where the proportion of 0·25 per cent. recommended by the Committee was exceeded, on the ground that the sale of cream containing more than this amount constituted the offence of selling an article which had been mixed with an ingredient so as to render the article injurious to health.

Considerable differences, however, existed in the attitude adopted by various local authorities towards the practice. The Local Government Board, therefore, directed that further information should be obtained, and, as a result, published a Report in 1909.* On the basis of this Report, the Public Health (Milk and Cream) Regulations, 1912, were issued, by which the use of preservatives in cream was controlled. These Regulations prohibited the addition of any preservative to cream containing less than 35 per cent. by weight of milk-fat and the addition to richer cream of any preservative except boric acid, borax (or a mixture of these substances), or hydrogen peroxide. They also required that, to every receptacle containing preserved cream there should be attached, when offered for sale, a label, of prescribed form and size, stating the percentage of preservative contained. An amending Order of 1917 further required that this label should bear the words "Not suitable for infants or invalids" and that, in the case of boron compounds, the amount added should not exceed 0·4 per cent. of boric acid by weight of the preserved cream. So long as these Regulations were in force, preservatives were very generally used by dairymen and creamery proprietors.

As a result of the recommendations of a Departmental Committee, appointed by the Minister of Health, that reported in 1924,† the position is now governed by the Public Health (Preservatives, etc., in Food) Regulations, 1925 and 1927, which came into operation as regards cream on January 1st, 1928. By these Regulations, the use of any form of preservative in cream is prohibited except in the case of cream intended to be exported or re-exported, or for use as ship's stores.

(b) **Thickening Substances.**—At one time, cream was often thickened, by the addition of various substances, in order to deceive the purchaser as to its richness.

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* Local Government Board Food Report No. 10, 1909.

† Final Report of the Departmental Committee on the Use of Preservatives and Colouring Matter in Food, 1924.

Before 1912, the addition of thickening substances to cream was regarded as a form of adulteration. The Departmental Committee on Milk and Cream Regulations, in their Report published in 1901,* recommended that the artificial thickening of cream by the addition of gelatine or other substances should be considered as raising a presumption that the cream was not genuine. As the Committee stated: "The richness of cream is roughly indicated by its thickness, and consequently the addition of a foreign substance for the purpose of giving it a fictitious appearance of thickness is obviously a deception of the consumer and a means of obtaining a higher price than the article, on its merits, would command." Thickeners were not definitely prohibited, however, until 1912, when, under the Public Health (Milk and Cream) Regulations of that year, it was made an offence to add any thickening substance to cream or preserved cream. The Public Health (Preservatives, etc., in Food) Regulations, 1925, which now control the position, prohibit the sale or importation for sale of cream containing any thickening substance.†

(c) **Colouring Matter.**—Artificial colouring matter has long been widely used in the preparation of manufactured milk products, particularly butter and cheese. In Scotland, under the Milk and Dairies (Scotland) Order, 1925, it is expressly forbidden to add any colouring matter to cream. There is no such provision in England and Wales, but it is not a common practice to colour cream artificially.

(iii) Cream Substitutes.

The Artificial Cream Act, 1929.—In view of the possibility of "artificial cream"—i.e., cream substitutes entirely composed of milk constituents—being sold as genuine cream and the impossibility of distinguishing such artificial cream by any known method, the sale of such products has, since 1st June, 1929, been regulated by the Artificial Cream Act of that year. Two principal conditions are imposed by the Act. Firstly, all premises, with certain exceptions, on which artificial cream is manufactured or sold must be registered with the appropriate local authority. Domestic premises, premises on which artificial cream is manufactured for incorporation in some other article of food, and premises from which artificial cream is supplied, as delivered, in properly closed and unopened receptacles, are, however, excluded from this requirement. Secondly, every receptacle containing artificial cream must boldly display the words "artificial cream," either on the container itself or on a label attached to it.

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* Cd. 491/1901.

† "Thickening substance" means sucrate of lime, gelatine, starch paste, or any other substance which when added to cream is capable of increasing its viscosity, but does not include cane or beet sugar.

The impossibility of distinguishing between cream and "artificial cream" tends to make the Act difficult to administer effectively, but it appears to have checked to some extent the substitution that threatened to become general.

The Act does, however, give rise to certain anomalies in practice. Thus, it is provided that "where any article having the composition of cream or artificial cream is sold or exposed or kept for sale on premises registered under this Act, it shall be presumed to be artificial cream unless the contrary is proved." If, therefore, cream is sold, on premises registered under the Act, in containers not marked "artificial cream," the onus of proving that the substance is, in fact, cream, appears to be on the seller, and, as it is impossible to distinguish analytically between the two substances, this may be a difficult matter. The importance of this consideration ought not to be overlooked; nevertheless, there appears to be some misconception among dairymen as to the full significance of registration under the Act. In a few cases, for example, dairymen are known to have registered under the Act, not because they actually dealt in artificial cream, but to be on the safe side should they ever consider adopting the manufacture and sale of that article. In effect, such registration carries with it the presumption, until the contrary is proved, that they sell nothing but artificial cream, and it is not impossible that they may find themselves charged with an offence for not labelling it as such and faced with the difficult task of proving that they were selling genuine and not artificial cream.

The statutory definition of "artificial cream" excludes from the scope of the Act cream substitutes containing fats other than milk-fat; but to describe such an article as cream is in any case a legal offence which can easily be checked. There is nothing, however, to prevent a substitute of this kind from being sold under a proprietary brand name of a kind calculated to give the consumer the impression that the article is genuine cream.

CHAPTER VI.—A SUGGESTED NATIONAL MARK SCHEME.

(i) General.

Legislation of the type described in the previous Chapter is based on the principle that it is proper for the State to invoke the criminal law to protect the consumer from any action on the part of the vendor that is calculated to prejudice the consumer's interests. It is, however, coming to be realized more and more that the protection of the consumer's interests is also the business concern of the vendor and certainly of the primary producer, and that, where questions of public health are not involved, protection in this sense can best be given by a service of controlled guarantees.

The producer's interest in the matter is clear. As it is to his good that there should be the maximum demand for his product, so he is the ultimate loser from anything that tends to cause dissatisfaction or to destroy confidence in his product.

With cream, it is the fat-content that largely determines its value. But, as there is no statutory minimum butter-fat standard for cream in this country, it is possible for any substance to be sold as cream which satisfies the description "that part of milk rich in milk-fat." In the wholesale trade, many individual distributors guarantee on the invoice that their cream contains at least 50 per cent. of butter-fat; but the public is left by the retailer to judge the richness of cream by the unsatisfactory criterion of thickness. The use of some mark of quality, guaranteeing the butter-fat content to the consumer, should, therefore, tend to increase demand.

It is clear, too, from the growing importation of tinned cream containing only about 25 per cent. of butter-fat, that a demand exists for a "lighter" and less expensive cream than most of the fresh cream that is sold in this country. This demand could be catered for and probably extended by putting on the market a homogenized fresh cream of a relatively low but guaranteed fat-content. At present, the production of "light" fresh cream is very small and localized.

Another important feature is sweetness. There is no doubt that the demand for fresh cream suffers from the fact that the keeping quality of the product cannot always be relied upon, particularly as the cheap, imported sterilized tinned cream, which is now on the market in considerable quantities, will keep indefinitely. It is obviously impossible for the vendor to give any definite guarantee of the length of time that fresh cream will remain sweet in the varying conditions under which it is kept by the consumer. But demand should be increased by marketing cream of a guaranteed standard of sweetness at the time of sale.

Even if there were no competition from imports or substitutes, the establishment of standards of quality for home-produced cream would, therefore, be desirable on its merits. But, in the larger consuming centres, at any rate, home-produced cream meets with competition from artificial and synthetic cream, from imported tinned sterilized cream, and, at some seasons, from fresh cream imported from the Irish Free State. It therefore needs all the support that an efficient marketing technique can give.

The fact that some of the fresh cream on the market is Irish is not generally known to the public, and, in the absence of any indication of origin, the consumer never doubts that it is home-produced. This suggests that home-produced cream which conforms to the defined standards of quality should be associated with a mark to indicate both quality and origin. The machinery for this exists in the Agricultural Produce (Grading and Marking) Acts, 1928 and 1931.

Under these Acts, the Minister of Agriculture and Fisheries is empowered to make regulations establishing and defining grade designations for any kind of agricultural product ; the use of such designations as a basis of sale conveys a guarantee that the quality of the product accords with the statutory definitions. The Minister is also empowered to establish marks to indicate grade designations and to authorize their application by persons who undertake to observe the conditions laid down and to submit to such measure of control as may be necessary. In this way, the National Mark has been established for use in conjunction with statutory grade designations as a grade designation mark for agricultural produce of England and Wales, and voluntary grading and marking schemes have been organized by the Ministry of Agriculture and Fisheries for a number of agricultural products. The Mark enables the vendor of agricultural produce to give the buyer a guarantee of quality and origin and provides a basis for national, regional or individual publicity.

It is suggested that a similar scheme should be organized for cream, which would thus reap the benefit of the goodwill which the National Mark already enjoys. It would be entirely voluntary. The grading would be performed by the industry itself, subject to a control service designed to maintain efficiency.

The problems that would arise in planning a National Mark scheme for cream are both technical and administrative. The technical problem is that of the quality standards to be observed, the administrative problem that of controlling the application of the Mark.

(ii) Standards of Quality.

The first step in planning a National Mark scheme would be the definition of quality standards. It is suggested, as a basis for discussion, that 4 grades might be established :—

(i) A grade, to be known as *Double* or *Double Thick* cream, with a minimum of 50 per cent. of butter-fat. This would include either pasteurized or unpasteurized cream of the quality now usually sold for domestic consumption.

(ii) A grade, to be known as *Double Thick Clotted* cream, for clotted cream. Clotted cream has usually a somewhat higher proportion of fat than fresh cream ; the minimum butter-fat content for this grade might, therefore, be 60 per cent.

(iii) A grade, to be known as *Light* cream, for cream of a minimum butter-fat content of 25 per cent., homogenized or not, and either pasteurized or unpasteurized.

(iv) A grade, to be known as *Light* (*Sterilized*) cream, for a sterilized tinned cream of a minimum butter-fat content of 25 per cent.; this would directly compete with the imported tinned product. The home production of this type of cream is at present small, but there appears to be scope for considerably greater production as a means of utilizing surplus milk.

For each grade, a standard of freshness would be fixed. In the case of the first three grades, this might be done by requiring that the cream must not develop more than a prescribed maximum of acidity on holding for three days at 60° F.; in the case of the fourth grade, by fixing a maximum bacterial content.

The National Mark would be applicable only to cream conforming to the standards laid down for the various grades. In addition, so as further to ensure that no cream of inferior quality was packed under the Mark, authorized packers and repackers (see below) would be required to have premises and equipment suitable for the production of high-quality cream, to keep all separators and other machinery and utensils clean and sterilized and to take all necessary steps to maintain cream awaiting sale in sweet condition and free from contamination. The use of containers of standard capacities, of approved materials and designs and bearing an indication of the volume of the contents would also be prescribed.

(iii) Administrative Arrangements.

(a) **Authorization of Packers and Re-Packers.**—Authority to apply the Mark would be granted both to packers of cream separated by themselves and to re-packers of purchased cream. Both packers and re-packers would be required to fulfil certain conditions. These would include, in the first place, the observance of the technical requirements outlined above. Secondly, in order to protect the Mark from abuse, it would be necessary to require all those authorized to apply the Mark to submit their premises and equipment to inspection by the control service (see below), both before authorization and periodically afterwards, and to allow any duly authorized officer of the control service to enter their premises in order to take samples of cream packed by them under the Mark. In order to ensure that only cream produced in England and Wales was packed under the Mark, they would also be required to keep satisfactory records designed to show, in the case of packers, the amount of milk used for cream separation and the amount of cream produced and its method of disposal, and, in the case of re-packers, the amount of National Mark cream received and sold. These records would be open to inspection.

(b) **Application of the Mark.**—The method of applying the National Mark to wholesale containers might be by affixing to the

address label an official label printed with the Mark. In addition to the National Mark label, the packer might be supplied with "quantity" labels of several denominations—e.g. 1, 2, 5 and 10 gallons—and might be required to attach to each container a label or labels of the appropriate denominations to indicate the amount of the contents. The total quantity of cream represented by the labels so used should then correspond to the actual output shown by the packer's records as marketed under the Mark and a check on the records would thus be afforded.

A similar method of marking by means of adhesive National Mark labels, serially numbered, might be adopted for cream packed for retail sale in cartons, tins, bottles or jars, the label being affixed either to the container or its lid or to the address label. As an alternative, the Ministry might license authorized packers or re-packers, or printers acting on their behalf, to incorporate the National Mark in private brand labels or in the design printed on lids or containers. Each authorized packer and re-packer would be allotted a registered number, which would be incorporated in all National Mark labels, lids and containers used by him.

(c) **Control Service.**—The main difficulty in regulating the use of the National Mark on fresh cream would be the large number of potential packers and re-packers. Apart from production by farmers, creameries and large-scale milk distributors, practically every retail dairyman either separates cream from purchased milk or re-packs purchased cream in retail quantities; many do both. The control of a well-supported National Mark scheme would therefore involve an administrative burden of some magnitude.

It is a matter for consideration whether milk producers themselves should not supply the necessary control service. The extension of the demand for home-produced cream is a matter that intimately concerns the milk industry as a whole. Of all the outlets that exist for milk outside the fluid market, the production of cream is the most remunerative. The control of cream grading and marking, and even the universal enforcement of standards of quality for cream are, therefore, business functions which might reasonably be assumed by an organized industry and provided for in any plan for rationalizing the marketing of milk in this country. The inspection of cream packed under the National Mark, as well as of the premises, equipment and records of packers and re-packers, would then be carried out by a producers' Board, the State merely exercising an over-riding supervision.

There are precedents, both in this country and abroad, for entrusting the main work of administering State grading and marking schemes to producers' and trade organizations. The method of quality-control adopted by organizations of butter and cheese producers in the Netherlands, subject to State supervision, is a good illustration.*

* See Chapter V of Section I of this Report and Economic Series No. 22, pages 64–6.

With tinned cream, the number of potential packers would be relatively small and there would not be the same difficulty of control. It is, therefore, a matter for consideration by producers and others concerned whether a start should not be made at once to prepare for a National Mark scheme for tinned cream.

CHAPTER VII.—PACKING.

(i) Wholesale Packages.

In the wholesale trade, cream, both home-produced and imported—except of course the tinned sterilized product—is generally sold in bulk. It is mainly dispatched in ordinary returnable milk churns or, in the case of smaller orders, in non-returnable 1 and 2-gallon cans (Fig. 45).

The largest size of milk churn used for cream is the 20-gallon conical churn in which Irish cream is commonly transported. For the trade in home-produced cream, the 10-gallon and 17-gallon churns are more commonly used. Smaller returnable cans down to 5-gallon capacity are also in use but are tending to be superseded by the non-returnable 1 and 2-gallon tins. For sizes above 2 gallons, the gauge of the metal has to be heavier to withstand rough handling, and this makes the container too expensive for use as a non-returnable. Non-returnable tins differ in small details of manufacture but are generally fitted with a drop handle and in all cases with a detachable lid which fits into the rim of the tin. To enable the tin to be easily emptied, a full-width lid is preferable.

Retail containers of pre-packed cream jars, bottles, tins and cartons when sold in wholesale quantities are generally packed in non-returnable wooden or fibreboard partitioned boxes. The number of tins per box is generally 48 or, in the case of large tins, 24.

Under a National Mark scheme, authorized packers would be required to pack National Mark cream for the wholesale trade only in standard containers of prescribed capacities and of approved materials and designs.

(ii) Retail Packages.

Cream is generally packed into the retail container by the retailer, not by the producer or wholesaler, except in the case of tinned sterilized cream and, to some extent, clotted cream. The commonest form of retail container is the waxed-paper carton (Figs. 47 and 48). The introduction of this package about 25 years

FIG. 43.—Discharging Finnish butter at Hull.

FIG. 44.—Swedish refrigerated butter wagon.

FIG. 45.—1-gallon and 2-gallon cream cans.

FIG. 46.—¼-lb. clotted-cream tin and basket.

ago greatly facilitated the sale of cream, particularly in small quantities. Previously, cream was sold either in bottles, jars or cans returnable by the consumer, or was measured directly into the consumers' own vessels. The use of bottles and jars, unless they were charged for at the time of sale, imposed a heavy loss on the retailer through non-return; this could only be covered by charging a higher price for the cream. Another objection to all these returnable containers was the trouble and expense of washing them for re-use. Single-service containers, besides eliminating these disadvantages, are light, clean (they are sterilized in manufacture by covering with hot paraffin-wax), and attractive in appearance. Some consumers still prefer cream in bottles or earthenware jars, but the proportion now sold thus is exceedingly small and the returnable can is no longer used in the retail trade.

Cream cartons are made conical in shape to facilitate packing when empty and are printed by the manufacturers with stock designs or to retailers' own designs. No charge is made for special designs if the quantities ordered are sufficiently large. The carton lids are either of the press-in or screw-on type. Press-in lids are the more common. They are apt to slip and spill the contents when being put in place and are somewhat difficult to remove, but are less expensive. The cost of cartons varies disproportionately with their size. That of the cheapest cartons varies from about one-tenth of the value of the contents in the smallest size sold ($\frac{1}{24}$th pint) to about one-thirtieth of the value in the pint size.

A great variety of sizes of cartons are used in the retail sale of cream. Between the pint and the $\frac{1}{24}$th-pint carton, for example, there are at least thirty different sizes and shapes in use. The demand for this large number has arisen through price competition in selling cream retail. As cream is not sold by declared volume, a retailer wishing to sell a carton of cream at a penny less than a competitor asks the manufacturer to provide him with a carton of slightly smaller capacity, the smaller size being in some cases concealed by varying the ratio of height to diameter or by the depth of insertion of the lid and of the bottom. In addition to cartons of recognized units of volume, such as the pint and half-pint, some retailers use cartons of intermediate sizes which, when filled, can be sold at an inclusive price equal to that charged for the recognized unit of loose cream. Thus, with the price of loose cream at 3*s.* per pint (20 oz.) a carton of cream containing 18 oz. could be sold also at 3*s.*, the 2 oz. of cream saved more than covering the cost of the carton. Such a carton is then sold by price description alone. The net contents of retail containers are, in fact, rarely stated on the container.

There is a pressing need for standardization of the sizes of cream cartons. It would cheapen carton production, facilitate trade and give consumers a guarantee of the exact quantity of cream they were getting and an opportunity of comparing prices.

It is suggested that a range of five sizes—viz. the 1, 2, 5, 10, and 20-oz. sizes—would adequately cover the demands of the public, and, under a National Mark scheme, authorized packers and re-packers might be required to pack National Mark cream for retail sale only in containers of these sizes and of standard materials and designs. The two grades of fresh cream—containing 50 per cent. and 25 per cent. of fat, respectively*—might be required to be distinguished by cartons of different colours, and the net contents of the container would also have to be declared.

For the postal trade in clotted cream, a container is required that will stand transit through the post without protection; for this reason, tins are generally used. For the retail trade, four sizes are used—viz., the $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., $\frac{3}{4}$-lb. and 1-lb.—and it is suggested that, under a National Mark scheme, all clotted cream packed under the Mark for retail sale should be required to be packed in containers of these sizes. The tins used are seamed and turned but unsoldered, usually unlacquered, and cost, per gross, for 5-gross lots, about 7*s.* for $\frac{1}{4}$-lb., 9*s.* for $\frac{1}{2}$-lb., 11*s.* 6*d.* for $\frac{3}{4}$-lb., and 13*s.* for 1-lb. sizes. The prices are slightly higher for smaller quantities. A few retailers have their tins or the lids or both embossed with their name and address or other publicity matter and some use lacquered tins printed with a design. In the case of large lots, these extras may be carried out by the makers free of charge. While tins require no additional protection in transit, some retailers pack them, if customers so wish, in baskets specially made for single tins of each of the above four sizes (Fig. 46). Some purchasers are apparently prepared to pay the additional cost of the basket—6*d.* to 1*s.* 3*d.*—for the sake of its attractive appearance, unnecessary though it may be.

About 8 different sizes of tins are used for canning sterilized cream, ranging from $3\frac{1}{2}$ to 16 oz., the sizes in most common use being 5-oz. and 6-oz. (Fig. 49). The tin is usually surrounded by a coloured brand label of the maker's or distributor's registered design, which indicates, *inter alia*, the net weight or, more rarely, the volume of the contents and their composition, particularly the percentage of fat. Where tinned cream is sold by volume, the $\frac{1}{4}$-pint size is generally used. Under a National Mark scheme, it might be sufficient for the needs of the trade to prescribe one size of container of a capacity of 5 oz.

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* See Chapter VI.

PART III.—DISTRIBUTION.

CHAPTER VIII.—TRANSPORT.

(i) Rail.

Passenger-train transport, because of its speed, is the most suitable for long-distance carriage of cream, and is always used in preference to goods train.

The rates for the conveyance of cream by passenger train in Great Britain depend chiefly on whether it is carried at Company's or at owner's risk, and on the size of the consignment. When cream is conveyed at Company's risk, the standard scales of rates for general parcels* apply. When conveyed at owner's risk, as it generally is, separate exceptional scales are in operation for quantities of less† than 12 lb. and of more‡ than 12 lb.

Specimen Rates for Conveyance of Cream by Passenger Train (151–200 miles).

Weight not exceeding.	*Standard Scale, Company's Risk. (C. and D.)*	*Exceptional Scale, Owner's Risk. (D.)*
lb.	*s. d.*	*s. d.*
10	1 5	1 1
20	2 7	1 5
30	3 8	1 9
40	4 9	2 4
50	5 10	2 11
60	6 11	3 5
70	8 0	3 11
80	9 1	4 8
90	10 2	5 2
100	11 3	5 8
112	12 6	6 2

C. and D. Including Collection and Delivery.
D. Including Delivery.

In addition to the above rates, exceptional "point to point" rates at owner's risk are arranged for large quantities when there is sufficient regular traffic to warrant them. Slightly lower rates are in these cases charged for cream in cans or churns than for the same quantities in bottles, jars or tins. The following are examples of these exceptional rates :—

* See Railway Clearing House *Scales of Rates for Conveyance of Parcels Traffic*, pages 2–4. Particulars may also be obtained from any railway station.

† Ibid, pages 13–16.

‡ Ibid, pages 17–19.

Exceptional "Point to Point" Rates for Conveyance of Cream by Passenger Train.

Journey.	Traffic.	Rate per cwt.	Conditions.
London to Sheffield (158 miles)	Cream, in bottles, jars, tins or wood-pulp pots—in wooden or fibre-board cases.	*s. d.* 5 6 (minimum 56 lb.)	Owner's Risk, Station to Station.
	Cream in cans ...	5 2 (minimum 56 lb.) 4 9 (minimum 1 cwt.)	
Melksham to Birmingham (113 miles)	Cream in cans ...	4 8 (minimum 1 cwt.)	
Trowbridge to London (97 miles)	Cream in cans ...	3 11 (minimum 56 lb.) 3 6 (minimum 1 cwt.) 3 2 (minimum 10 cwt.)	

None of the rates includes the carriage of returned empty cans, which are conveyed at the "Returned Empties" rate. Milk, on the other hand, is conveyed at inclusive rates which cover the return of the empty churns.

No special provision—such as refrigerated or insulated wagons—is made for cream traffic by the railway companies. The only routes where sufficient traffic is available at any time to fill a complete railway wagon are those from Fishguard and Holyhead to London for the conveyance of cream imported from the Irish Free State; for this traffic, ventilated wagons are used. Home-produced cream is usually carried in the guard's van.

(ii) Road.

Road transport is used for cream for short-distance traffic, from country creameries to wholesalers or retailers in nearby towns, from urban wholesalers to retailers in the same town or district, and from retailers to consumers. The producers' or distributors' own vehicles are generally used. Wholesale distributors who have regular rounds in some cases use insulated motor vans in order to maintain the cream at a low and even temperature during distribution; otherwise, the ordinary motor vehicles (lorries and vans) and horse-drawn vehicles, such as are used for milk haulage, are considered adequate.

(iii) Postal Traffic.

A considerable quantity of clotted cream is sent from the south-western counties by post in small lots. Cream sent by parcel

post is required to be packed so that the contents will not soil or taint other packets. "Where a tin is used, the lid must fit tightly and the tin should be wrapped in greaseproof or corrugated paper and securely tied with string crossing the lid in two directions."*

Additional precautions are necessary where cream is sent by letter post. "Semi-liquids and greases must have an inner covering, securely closed, of greaseproof paper or some substance impervious to moisture and grease, and an outer covering of metal or wood, sufficiently strong to prevent any risk of the contents escaping during transit."* In practice, however, the usual method of packing, which is accepted by the postal authorities, is in tins, without any greaseproof paper lining, wrapped in brown paper and tied with string in the required way.

As the weight of cream dispatched is generally below the minimum parcel post weight (2 lb.), most cream sent by post goes at letter rates. The rates for cream sent by letter and parcel post are as follows :—

Not exceeding	*s.*	*d.*
4 oz.	0	2
8 ,,	0	3
12 ,,	0	4
16 ,,	0	5
2 lb.	0	6
5 ,,	0	9
8 ,,	1	0
11 ,,	1	3

No parcel may exceed 11 lb. in weight.

The arrival of the cream in satisfactory condition largely depends on quick delivery. It is not possible for the postal authorities to provide special services to decrease the risk of souring in transit ; cream has to take its chance with other packets. It is not surprising, therefore, that since the use of preservatives was prohibited, the postal traffic in cream has considerably diminished. The senders most affected are, of course, those whose standards of cleanliness and treatment of the raw material are lowest. The postal trade in clotted cream happens to be very great at the Christmas season, and, as senders delay posting as long as possible owing to the perishability of the commodity, the risk of loss through congestion in postal traffic at that time is high.

CHAPTER IX.—THE WHOLESALE TRADE.

(i) Fresh Cream.

The wholesale trade in fresh cream includes sales from farms in comparatively small quantities, and sales in large units by the creamery or large-scale urban distributor.

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* Post Office Guide.

Cream, except clotted cream, is not usually sold by farmers to retailers but mainly goes from farms to creameries, generally for butter-making (Fig. 5). Creameries are the retailers' most important source of supply.

The trade in fresh cream from Ireland is carried out directly between the creamery in Ireland and the creamery wholesaler or retailer in this country.

(a) **The Farmer-Wholesaler.**—The sale of cream wholesale by farmers to local creameries is common in Cornwall and Devon and to some extent in Somerset, and it is being developed in south-west Wales. Elsewhere, cream selling by farmers in wholesale quantities is less widely practised. The cream is delivered to the depot or collected, sometimes every other day, sometimes twice a week, sometimes—in winter—only once a week. Although the farmer does not always pay sufficient attention to keeping the separator clean and delivering to the creamery at frequent intervals, the sale of farm-separated cream in wholesale quantities to creameries has certain advantages. The skimmed milk is retained on the farm where it can be more advantageously used for feeding stock and the transport costs for the cream are consequently low. The sale of cream by farmers to creameries is generally for butter manufacture ; it is less suitable for the fluid cream trade, though a certain proportion is re-sold by the creameries for this purpose. In the south-western counties, fresh cream is bought by creameries for re-sale as clotted cream.

A certain quantity of cream is sold by farmers to retailers, but this trade is not important. In some cases, a few cartons of cream are sold by auction along with butter and other produce in the country produce auctions in the south of England. Clotted cream, together with other dairy produce, poultry and eggs, is commonly sold by private treaty in the "pannier" markets of Devon and Cornwall, both wholesale and retail.

(b) **The Creamery Wholesaler.**—Cream is sold wholesale by many creameries mainly concerned with milk distribution. Their plant and their selling organization serve equally well for cream as for milk. They are generally located in intensive milk-producing areas and, in many cases, are the country assembling points of urban milk distributing firms.

The creameries have certain advantages from the standpoint of the wholesale cream trade. Cream is a perishable commodity and the demand for it is exceedingly irregular from day to day. The adjustment of supply to demand is therefore a matter of difficulty. The fluctuations in demand cannot be met to any extent by carrying stocks, more particularly since the prohibition of preservatives. This means that the volume of production must correspond closely with the demand from day to day. The creamery, engaging as it does in other branches of the dairy industry, has large reserves of raw material and is thus in a position

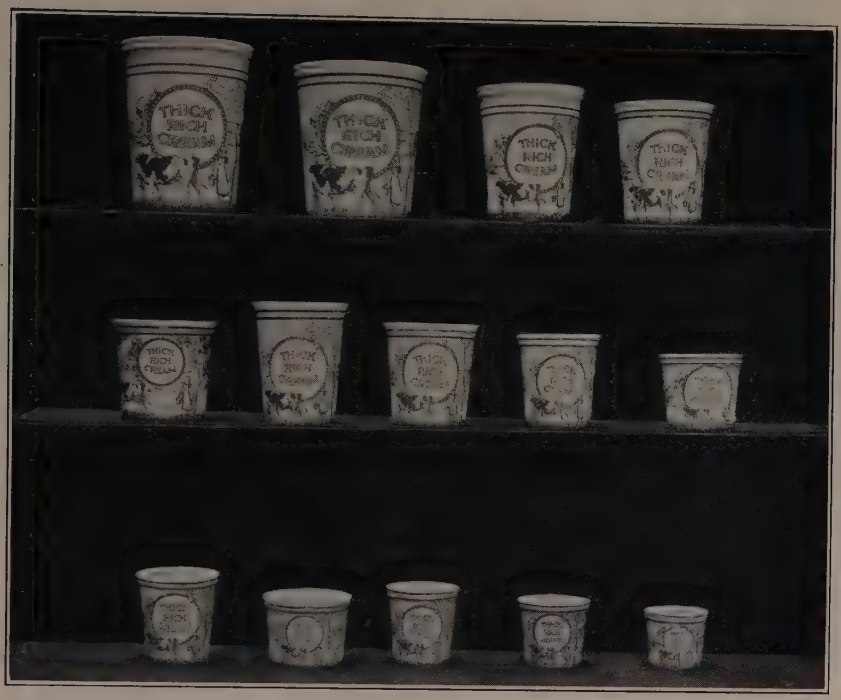

FIG. 47.

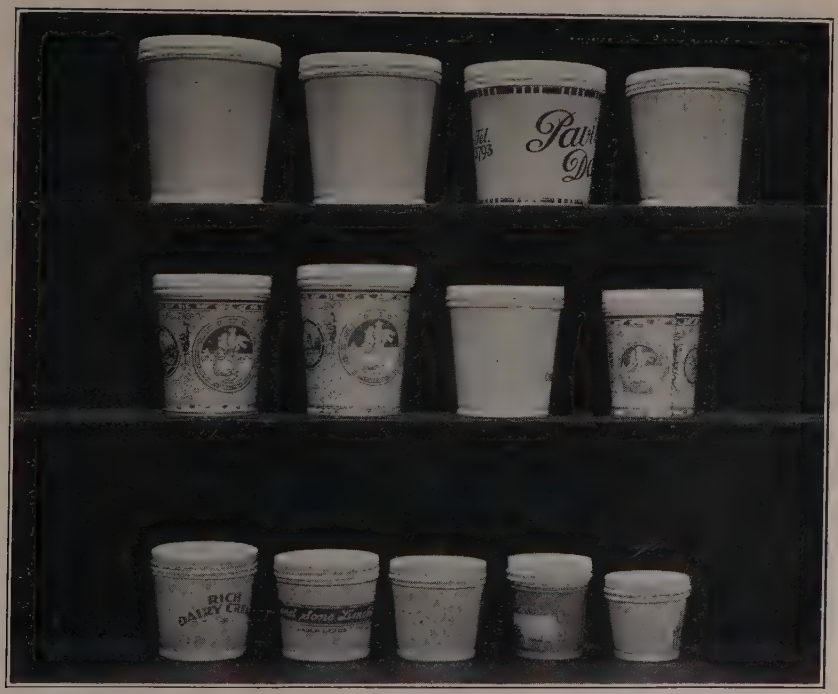

FIG. 48.
Cream cartons, showing wide range of capacities and shapes.

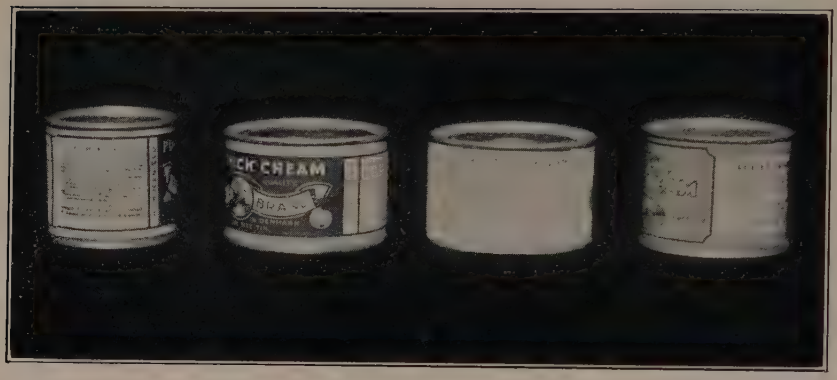

FIG. 49.—Sterilized-cream tins.

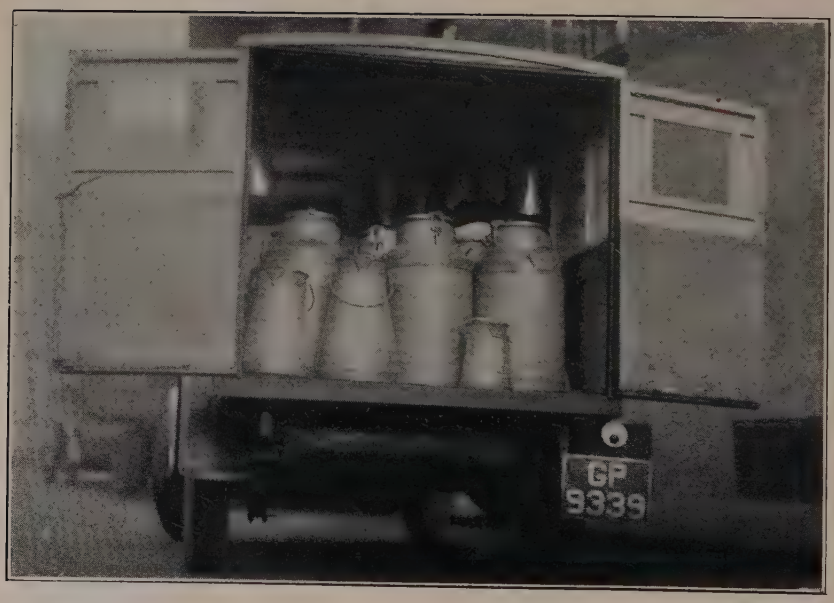

FIG. 50.—Van for wholesale delivery loaded with cream churns.

to produce just such quantities of cream as are required. Cream that is not sold can be disposed of, though to less advantage, in manufacture. The creamery, again, is better equipped than the farmer and the small urban retailer for maintaining cream in sweet condition during distribution.

Creameries engaged in the wholesale cream trade are, by force of circumstances, chiefly situated in the country. The difficulty of gauging the highly variable demand and of disposing of the separated milk, and the higher cost of transporting milk as compared with cream, generally makes cream separation in consuming centres uneconomical. When cream is produced at a distance from the consuming area, however, a certain amount of processing is necessary, and there must be an efficient delivery service to enable the cream to reach the retailer in sweet condition. Usually, the cream is pasteurized by the " flash " method and brine-cooled, and it may then be held in cold-store until shipment. Homogenization, which is the regular practice with tinned sterilized cream, is not usual in the " heavy " cream trade ; not only, as a rule, has such cream sufficient natural viscosity, but cream surplus to sales requirements, if it has been homogenized, cannot be manufactured into butter.

Frequent and prompt deliveries of cream from creamery to retailer are essential. Generally, the cream is dispatched in the evening so as to reach the retailer the next morning ; in some cases, particularly where the distance is short, it is sent out in the morning and is available for sale in the dairyman's shop or on his second round the same day. Some of the wholesaler's trade is to meet standing orders for stated quantities to be delivered at specified times each day or at the week-end. Generally, however, and particularly in summer when demand is at its height but more variable, orders are given at short notice according to the retailer's immediate requirements.

Practically the whole output of creameries is sold in bulk. There is little pre-packing into retail containers owing to the difficulty that retailers have in estimating their requirements of each unit.

Some creameries, besides producing cream, distribute cream bought from farmers ; at certain seasons, some are large distributors of Irish Free State cream, which is used to augment their own output. Some retailers, however, purchase Irish cream direct.

(c) **The Urban Wholesaler.**—The urban wholesale cream trade is mainly conducted by large-scale milk distributors who separate cream from their own supplies of milk. Cream is supplied either to large-scale cream users, such as hotels, restaurants, cafés, schools, bakers and confectioners, or to other retailers, such as fruiterers, fishmongers and butchers, for resale. The demand from the former type of purchaser has, however, diminished with the

increased use of cream substitutes, and the amount of cream sold by tradesmen other than dairymen is comparatively small. The amount of cream wholesaling by urban distributors is thus decreasing.

There are, in addition, a few specialist urban cream wholesalers who obtain supplies of cream from country creameries, which are often under their own control, for sale mainly to retail dairymen. Pasteurizing and refrigerating plant is installed and all supplies are pasteurized at the town depot irrespective of whether it has already been done in the country or not. There is generally a regular and frequent delivery round (Fig. 50), the customer taking as much as he requires at each delivery without having to notify his requirements in advance.

(ii) Tinned Cream.

Tinned cream, like other canned goods, is mainly handled by grocery firms. As it will keep more or less indefinitely, it can be handled with safety under conditions unsuitable for the sale of fresh cream.

The manufacture of tinned cream has not so far been much developed in this country. Supplies are largely obtained from abroad, principally from Denmark and the Netherlands, and to some extent from Switzerland, Norway and the Irish Free State ; the importer and wholesaler thus play a large part in the distribution of this commodity.

(a) **The Importer.**—The importer of tinned cream generally handles canned goods of all kinds as well as other commodities, such as jams and honey. He usually acts as the agent of the overseas creamery and sells on a commission basis. The rate of commission is usually from 3 to 4 per cent., but may be as much as 5 per cent. Some importers, however, purchase outright for re-sale. Large-scale retailers, such as multiple-shop firms and chain-stores, as well as the Co-operative Wholesale Society, act as importers on their own account. Indeed, with the development of multiple shops during recent years, direct buying by the retailer has tended to increase, and the importance of the importers and wholesalers proper has correspondingly diminished. In some instances, however, though transactions between factory and retailer are carried out direct, the agent of the consigning factory in this country draws a commission.

Importers' businesses are situated in the principal ports, such as London, Liverpool, Manchester, Newcastle, Bristol and Cardiff ; many of the London businesses have branch offices or representatives in other ports. The main functions of the importer include soliciting orders from buyers, apportioning deliveries, receiving payments and transmitting returns to shippers. Sales are conducted both on intermittent orders and under contracts

(see below); prices are either c.i.f. or ex store; and the general terms of the trade are either cash with documents or a month's credit less interest for any unexpired portion of the period.

(b) **The Wholesaler.**—The wholesaler forms the link between the importer and the retailer. The wholesaling of tinned cream is mainly carried on by general provision merchants handling a wide variety of groceries and provisions, among which tinned cream is a relatively small item. Many wholesalers, particularly the largest firms, obtain at least a proportion of their supplies under forward contract with the importer. Such contracts are usually made in spring to cover the period of greatest demand, that is, the summer, and are based on estimated requirements for from three to six months. Although prices are customarily named in the contract, provision is usually made for any reduction that may take place in the general level of prices, the buyer receiving the benefit on the undelivered portion of his contract. Deliveries are taken by the wholesaler as required. Wholesalers of tinned cream now tend more and more to carry light stocks and to order frequently as occasion demands.

CHAPTER X.—THE RETAIL TRADE.

(i) The Farmer-Retailer.

The farmer-retailer of cream, who generally sells in the smaller provincial towns, particularly seaside resorts, usually has a retail milk-round. His share in the retail cream trade is small. He is often handicapped through not having a sufficient reserve of milk for separation to meet the wide differences in the demand for cream from day to day and particularly the increase which occurs at the week-end. Generally, too, he lacks facilities for pasteurization and refrigeration, without which it is difficult to maintain a cream trade satisfactorily.

(ii) The Retail Dairyman.

The retail cream trade is mainly carried on by retail dairymen who, in many cases, produce at any rate part of their supplies from purchased milk. The disadvantages which attend the retailing of cream by farmers are met with, though to a less degree, by the retail dairyman who separates his own cream; a further disadvantage in this case is the difficulty of disposing of the separated milk. Considerable quantities of separated milk have to be thrown away by dairymen—and may constitute an objectionable effluent—or have to be carried back into the country for pig-feeding.

The separation of milk by retail dairymen is less common in the large cities and industrial districts where the milk is received from a distance than in those towns which obtain their supplies

locally. Short-distance milk received direct from the farmer, being fresher and unpasteurized, is more suitable for separation.

The retail dairyman, if he does not separate his own cream, generally obtains it from a creamery or, in some instances, from a farmer. Even those retailers who separate cream do not generally depend solely on their own output ; they also buy from the wholesaler. From the dairyman's standpoint, cream separation is a convenient way of using up milk returned from the rounds. He often relies for his main supplies on purchased cream, adjusting his purchases according to the quantity available from his own separator. Where there is a regular surplus of milk, however, purchases of cream are only resorted to as a means of augmenting supplies at certain seasons or at week-ends.

(iii) Other Retailers.

Fruiterers, fishmongers, butchers, confectioners and caterers frequently sell cream, mainly obtained pre-packed in bottles and cartons from local cream wholesalers or, to a less extent, from country creameries. Orders may be given daily or, as often happens, to meet the week-end trade only. The sale of cream by retailers of these types has diminished somewhat owing to the prohibition of preservatives. Small quantities of cream are also sold in general retail markets on the stalls of fruiterers and greengrocers.

Tinned sterilized cream is mainly sold by grocers, multiple shops, chain stores and general stores.

(iv) Methods of Sale.

Retail dairymen sell both on milk rounds and from shops, more commonly the former. Sales of cream by other retailers are mainly from shops. Cream sold on milk rounds is sometimes delivered only to order, but frequently a number of cartons or bottles are also taken for chance sale. The roundsman knows fairly well from experience how much cream is likely to be required in addition to the orders, but it is difficult to estimate the numbers of containers of the different sizes that may be asked for.

Cream sold in dairy shops is usually filled into the retail container in the consumer's presence. It is sometimes kept on the counter in an open or lidded bowl, from which the containers are filled with a small dipper. More frequently, it is kept in an open jug of about two-quarts capacity, from which it is poured direct into the containers. A jug with a hinged lid and a spout at the side, from which cream can be poured without lifting the lid, has been recently introduced for counter use. It has the advantage of protecting the contents from dust.

The disposal of unsold cream left over from the rounds presents a greater problem than that of cream unsold from day to day in the shops. Many dairy shops have refrigerating cabinets or cool-stores, so that cream that has been kept in the shop can be

carried over from day to day. But cream which has been out on the rounds, particularly in warm weather, cannot be relied upon to keep sweet for a subsequent delivery. If it is not homogenized, it can be made into butter, which, though less profitable than the sale of cream, saves the most valuable constituent—the butter-fat—from being wasted. A more profitable method of utilization of surplus cream is in the manufacture of cream cheese.

The sale of clotted cream is much more localized than the fresh cream trade. West of a line from Bournemouth to Yeovil, clotted cream is the type generally sold, but elsewhere, except in some south-coast towns and in a few shops in London, its sale is almost non-existent. Generally, clotted cream is sold by the same kinds of retailers as those concerned with fresh cream, but in the counties of Devon and Cornwall, where it is principally made, it is also sold in summer in many retail shops—florists and general stores, for example—which do not stock cream at other seasons. Clotted cream is mostly sold by weight and is generally weighed into the container in the customer's presence.

Many retailers make a speciality of consigning clotted cream by post to the order of customers at an inclusive charge (see Chapter II); the notice "Cream sent by post" adorns the walls and windows of almost every dairy shop in Cornwall and Devon.

The retail sale of tinned cream is closely associated with that of tinned and bottled fruits, and some retailers, in summer, list a tin of cream and a tin or bottle of fruit at an inclusive price.

PART IV.

CHAPTER XI.—CONCLUDING OBSERVATIONS.

The annual consumption of cream per head of population in this country is at present less than 1 pint. The increase in consumption that has taken place since the War (Chapter I) suggests, however, that there is considerable scope for an expansion of the cream trade. The demand for cream, unlike milk, is highly elastic and there is abundant raw material for its production—only about one-thirtieth of the total output of milk being at present used for the purpose. The effect of increased consumption would be to provide a wider outlet for milk which is surplus to the fluid market, and one which, being less subject to the competition of imports, is more remunerative than that provided by other dairy products, such as butter and cheese.

The main reason why cream is not more widely and more regularly used is its high price. The "heavy" cream generally sold in this country contains in the neighbourhood of 50 per cent. of butter-fat. For many purposes, cream of this high fat-content is not essential; a "light" cream containing about 25 per cent. of fat, such as is already sold in some districts, would in most cases adequately meet consumers' requirements and would be cheaper. It is only for special purposes that "heavy" cream suitable for whipping is required. The increase that has taken place in recent years in the sales of imported tinned cream, which generally contains only from 20 to 25 per cent. of fat, though partly due to the long-keeping properties of the product, is largely due to its relative cheapness; the expansion of this trade gives some indication of the demand that might be expected if a cheap "light" fresh cream of guaranteed fat-content were made generally available.

The demand for cream is further hindered by the fact that the consumer is given no assurance of its quality—that is to say, its richness and keeping properties—and, in many cases, does not even know the exact quantity received, since cream is commonly sold retail in containers of undeclared capacity.

As regards richness, there is no legal minimum butter-fat content for cream in this country as there is in some others (see Appendix); the consumer is left to judge richness by the unsatisfactory criterion of thickness. Where a "light" cream of low butter-fat content is sold, the consumer is even more in the dark

as to its true richness, since in order to give the product an attractive appearance it is generally artificially thickened by homogenization.

As regards keeping-quality, some guarantee of freshness is particularly necessary now that the use of preservatives is prohibited and in view of the competition of imported tinned cream which will keep indefinitely. The purchase of cream which, within a short time, becomes unusable undoubtedly tends to check demand.

These are marketing problems which it is suggested might be solved by the establishment of a National Mark scheme for cream produced in England and Wales, such as is outlined in Chapter VI. The essence of a National Mark scheme is that the vendor voluntarily applies to his goods a controlled mark—the National Mark—guaranteeing quality and origin, and thereby not only renders himself liable to civil process in the event of default, but also submits himself to a measure of control to ensure the general observance of the conditions on which permission to apply the Mark is granted. These conditions, under a cream scheme, would include, *inter alia*, the observance of a defined standard of quality and packing and the maintenance of plant and premises at a required standard of efficiency and cleanliness. Permission to apply the Mark to cream would be granted both to cream producers (farmers, creameries and dairymen) and to re-packers of purchased cream, who are mainly retail dairymen. The number of potential packers and re-packers of cream is, however, so great that the control of a well-supported scheme would involve an administrative burden which the State could not be expected to assume. Moreover, the expansion of the demand for cream, which would be the main object of a National Mark scheme, is the direct concern of the milk industry as a whole. It is therefore suggested that, subject to over-riding supervision by the State, the control service required should be provided by organized milk producers themselves as part of a scheme for the organization of milk marketing.

One direction in which it is possible to foresee early development is in the production of tinned cream. Imports of this product have grown rapidly in recent years and seem to have met a need for a cheaper and better-keeping article than fresh rich cream (Chapter II). The amount of cream at present canned in this country is trifling, but it may be assumed that expansion would follow from the organization of milk marketing now in contemplation. The number of units producing tinned cream is unlikely to be great and control of a National Mark scheme for this commodity would not present the same administrative difficulty as in the case of fresh cream. It is, therefore, a matter for consideration whether a movement should not be made now, in spite of the present small scale of production, to prepare a National Mark scheme for tinned cream produced in England and Wales.

Such a scheme would provide a guarantee of quality and a basis for advertising which should promote the development of cream canning in this country.

Markets Division,

Ministry of Agriculture and Fisheries,

April, 1932.

NOTE. For a list of other Reports in this Series, see inside of front cover.

TABLE I.—*Imports of Butter into the United Kingdom* in the Years* 1901–13 *and* 1922–31, *with Re-exports and Balance retained for Home Consumption.*

Year.	Imports.		Re-exports.		Imports retained for Home Consumption.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£
1901	3,702,890	19,297,396	49,956	254,746	3,652,934	19,042,650
1902	3,974,933	20,526,690	44,386	227,576	3,930,547	20,299,114
1903	4,060,694	20,798,707	63,511	312,703	3,997,183	20,486,004
1904	4,241,005	21,117,162	86,666	409,319	4,154,339	20,707,843
1905	4,147,866	21,586,622	70,518	357,658	4,077,348	21,228,964
1906	4,337,258	23,460,196	77,504	396,995	4,259,754	23,063,201
1907	4,210,156	22,417,926	83,591	418,643	4,126,565	21,999,283
1908	4,210,821	24,080,912	55,078	305,729	4,155,743	23,775,183
1909	4,062,812	22,424,962	72,315	383,692	3,990,497	22,041,270
1910	4,325,539	24,493,450	68,344	384,088	4,257,195	24,109,362
1911	4,302,692	24,600,619	135,552	759,214	4,167,140	23,841,405
1912	4,005,159	24,354,193	119,021	715,096	3,886,138	23,639,097
1913	4,139,028	24,083,658	105,670	584,674	4,033,358	23,498,984
1922	4,268,561	37,315,536	452,507	3,435,319	3,816,054	33,880,217
1923	5,095,511	44,234,534	141,914	1,238,512	4,953,597	42,996,022
1924	5,287,244	49,647,492	191,162	1,715,871	5,096,082	47,931,621
1925	5,853,245	53,204,417	350,566	3,050,763	5,502,679	50,153,654
1926	5,818,840	48,283,312	226,650	1,832,154	5,592,190	46,451,158
1927	5,818,611	48,204,721	236,971	1,911,149	5,581,640	46,293,572
1928	6,112,972	52,044,506	164,482	1,347,059	5,948,490	50,697,447
1929	6,397,266	54,706,404	122,717	1,083,676	6,274,549	53,622,728
1930	6,821,620	46,869,697	173,201	1,110,206	6,648,419	45,759,491
1931	8,071,167	46,357,997	351,418	1,961,930	7,719,749	44,396,067

* After April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE II.—*Average Annual Gross Imports of Butter into the United Kingdom* in the Periods* 1900–4, 1909–13, 1922–6 *and* 1927–30 *and in* 1931, *distinguishing the Principal Sources of Supply.*

Country of Origin.	1900–4.		1909–13.		1922–6.		1927–30.		1931.
	000 cwt.	Per cent.	000 cwt.	Per cent.	000 cwt.	Per cent.	000 cwt.	Per cent.	000 cwt.
New Zealand	206·8	5·3	303·7	7·3	1,145·1	21·7	1,335·7	21·3	1,935·0
Australia	256·7	6·8	621·0	14·9	807·0	15·3	770·1	12·3	1,558·6
Irish Free State	—	—	—	—	370·6	7·0	558·4	8·9	381·0
Canada	218·7	5·6	20·4	0·5	110·4	2·1	0·5	—	†
Other British Countries	1·2	—	1·3	—	6·4	0·2	2·8	—	†
Total British Countries	683·4	17·7	946·4	22·7	2,439·5	46·3	2,667·5	42·5	
Denmark	1,653·4	42·7	1,704·4	40·9	1,712·1	32·5	2,133·3	34·0	2,466·0
Argentine	56·4	1·4	60·7	1·5	476·9	9·1	375·8	6·0	374·9
Russia	393·5	10·2	651·8	15·7	173·5	3·3	285·6	4·5	404·4
Finland					144·9	2·8	217·8	3·5	254·1
Estonia					22·8	0·4	86·1	1·4	125·4
Latvia					42·1	0·8	54·4	0·9	†
Sweden	197·4	5·1	337·1	8·1	69·8	1·3	217·3	3·4	211·7
Netherlands	314·2	8·1	134·9	3·2	114·3	2·2	129·7	2·1	96·1
Other Foreign Countries	573·3	14·8	331·7	7·9	68·8	1·3	110·5	1·7	263·9‡
Total Foreign Countries	3,188·2	82·3	3,220·6	77·3	2,825·2	53·7	3,610·5	57·5	
Gross Total	3,871·6	100·0	4,167·0	100·0	5,264·7	100·0	6,278·0	100·0	8,071·1

* After April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

† Included in "Other Foreign Countries."

‡ This figure includes imports from all countries (British and foreign) for which separate figures are not given.

TABLE III.—*Imports of Butter into certain Ports of Great Britain in the years* 1926–30.

Port.	1926.	1927.	1928.	1929.	1930.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
London ...	2,649,086	2,474,247	2,792,796	2,865,648	3,196,574
Grimsby ...	580,938	638,126	647,636	711,257	747,027
Newcastle ...	467,297	482,714	497,214	568,336	598,719
Hull	414,021	429,205	411,426	508,393	498,843
Leith	437,556	439,768	455,164	47,837	492,464
Fishguard ...	251,829	311,340	275,242	291,214	241,987
Harwich ...	221,018	242,465	252,473	302,532	345,833
Southampton	247,099	228,217	225,603	155,587	118,785
Liverpool ...	151,135	160,397	169,013	151,576	210,204
Goole	140,624	156,344	156,617	155,556	166,663
Glasgow ...	79,295	85,452	94,989	78,428	85,866
Bristol ...	32,316	43,909	31,481	31,861	44,447
Holyhead ...	38,675	40,658	24,457	15,239	9,300
Manchester ...	27,815	8,163	3,036	5,117	821

TABLE IV.—*Imports of Cream into the United Kingdom* in the Years* 1901–13 *and* 1922–30, *with Re-exports and Balance retained for Home Consumption.*

Year.	Gross Imports.		Re-Exports.		Imports Retained for Home Consumption.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwt.	£	Cwt.	£	Cwt.	£
1901 ...	6,250	30,990	52	245	6,198	30,745
1902 ...	5,413	27,386	70	337	5,343	27,049
1903 ...	7,314	31,777	201	931	7,113	30,846
1904 ...	6,339	25,377	646	3,127	5,693	22,250
1905 ...	4,996	19,933	957	4,429	4,039	15,504
1906 ...	4,591	18,066	622	3,122	3,969	14,944
1907 ...	4,231	16,290	564	3,129	3,667	13,161
1908 ...	6,862	26,556	704	3,223	6,158	23,333
1909 ...	6,837	27,875	470	2,296	6,367	25,579
1910 ...	11,197	46,532	494	2,492	10,703	44,040
1911 ...	10,637	40,743	495	2,617	10,142	38,126
1912 ...	5,464	22,629	548	2,597	4,916	20,032
1913 ...	9,778	40,454	700	3,910	9,078	36,544
1922 ...	11,175	88,141	129	2,056	11,046	86,085
1923 ...	45,358	240,436	211	2,725	45,147	237,711
1924 ...	58,416	326,779	818	8,724	57,598	318,055
1925 ...	88,854	489,514	725	7,559	88,129	481,955
1926 ...	92,107	477,395	476	4,758	91,631	472,637
1927 ...	124,811	667,269	584	5,204	124,227	662,065
1928 ...	148,292	795,777	1,008	7,269	147,284	788,508
1929 ...	138,604	702,476	810	6,024	137,794	696,452
1930 ...	135,956	629,403	1,334	8,714	134,622	620,689

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE V.—*Imports of Cream into the United Kingdom* in the Years* 1901–13 *and* 1922–30, *distinguishing the Principal Sources of Supply.*

Country of Origin.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Irish Free State	—	—	—	—	—	—	—	—	—	—	—	—	—
Other British Countries	—	—	—	25	—	17	—	—	—	—	—	—	—
Total British Countries	—	—	—	25	—	17	—	—	—	—	—	—	—
Norway	24	49	958	1,333	1,823	1,333	1,202	1,345	800	870	1,020	1,006	1,678
Denmark	1,235	1,065	722	380	75	20	—	27	3	2	—	—	—
Netherlands	1,493	1,210	921	830	275	46	169	485	105	85	2,043	9	—
France	3,498	3,053	4,642	3,711	2,789	3,168	2,821	4,839	5,876	10,219	7,535	4,423	8,093
Switzerland	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Foreign Countries	—	36	71	60	34	7	39	166	53	21	39	26	7
Total Foreign Countries	6,250	5,413	7,314	6,314	4,996	4,574	4,231	6,862	6,837	11,197	10,637	5,464	9,778
Gross Total	6,250	5,413	7,314	6,339	4,996	4,591	4,231	6,862	6,837	11,197	10,637	5,464	9,778

* Since April 1st, 1923, United Kingdom means Great Britain and Northern Ireland.

TABLE V.—*cont.*

Country of Origin.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Irish Free State	—	34,243	48,487	65,572	64,736	91,253	87,716	76,586	67,119
Other British Countries...	—	23	—	24	—	35	63	64	36
Total British Countries	—	34,266	48,487	65,596	64,736	91,288	87,779	76,650	67,155
Norway	4,293	1,641	1,552	2,781	2,779	668	1,842	620	566
Denmark	2,062	3,746	3,852	7,267	12,289	18,496	34,611	39,484	46,993
Netherlands	2,445	3,870	4,512	12,189	11,044	8,578	15,678	14,324	13,470
France	2,319	1,726	—	696	331	295	—	—	—
Switzerland	—	5	4	5	550	4,601	5,889	7,030	6,850
Other Foreign Countries	56	104	9	320	378	885	2,493	496	922
Total Foreign Countries	11,175	11,092	9,929	23,258	27,371	33,523	60,513	61,954	68,801
Gross Total	11,175	45,358	58,416	88,854	92,107	124,811	148,292	138,606	135,956

TABLE VI.—*Monthly Imports of Cream into the United Kingdom* in the Years* 1928–30.

Month.	1928.		1929.		1930.		Average 1928–30.	
	Cwt.	Per cent.	Cwt.	Per cent.	Cwt.	Per cent.	Cwt.	Per cent.
January ...	9,799	7	6,769	5	6,629	5	7,732	6
February ...	9,989	7	7,232	6	6,903	5	8,041	6
March ...	12,957	10	6,063	5	7,726	6	8,915	7
April ...	11,078	8	10,170	8	9,833	8	10,360	8
May ...	11,571	9	11,732	9	14,168	11	12,490	9·5
June ...	13,770	10	10,231	8	15,509	12	13,170	10
July ...	16,373	12	19,343	15	17,475	14	17,730	13·5
August ...	16,409	12	14,678	11	12,455	10	14,514	11
September ...	9,905	7	10,864	8	9,479	7	10,083	7·5
October ...	9,722	7	10,975	8	9,903	8	10,200	7·5
November ...	8,129	6	7,283	6	7,550	6	7,654	6
December ...	6,518	5	14,071	11	10,541	8	10,377	8
Total ...	136,220	100	129,411	100	128,171	100	131,266	100

* Excluding imports into Northern Ireland through land boundary stations.

APPENDIX.

SUMMARY OF LEGAL MINIMUM BUTTER-FAT REQUIREMENTS FOR CREAM IN VARIOUS COUNTRIES.

Country or State.	Minimum Butter-fat Content Prescribed.	Applicable to :—
	Per cent.	
New South Wales	35	"Cream."
	25	"Reduced Cream."
South Australia	35	"Double Cream."
	25	"Single Cream."
Tasmania ...	35	"Cream."
	25	"Reduced Cream."
Victoria	35	"Cream" and "Reconstituted Cream."*
	25	"Reduced Cream" and "Reconstituted Reduced Cream."
Western Australia	35	"Cream."
	25	"Reduced Cream."
Canada :—†		
Manitoba ...	25	Evaporated, clotted, condensed or any other special cream except ice-cream.
	18	"Cream." (Cream containing less than 18 per cent. of butter-fat must have the percentage plainly indicated on the container.)
Saskatchewan ...	18	"Cream."
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